5 Gear Unit Mounting Positions

5.1 General notes on mounting positions – R, F, K, S, W gear units

SEW-EURODRIVE differentiates between six mounting positions M1 ... M6 for gear units and gearmotors. The following figure shows the position of the gear unit in mounting positions M1 ... M6

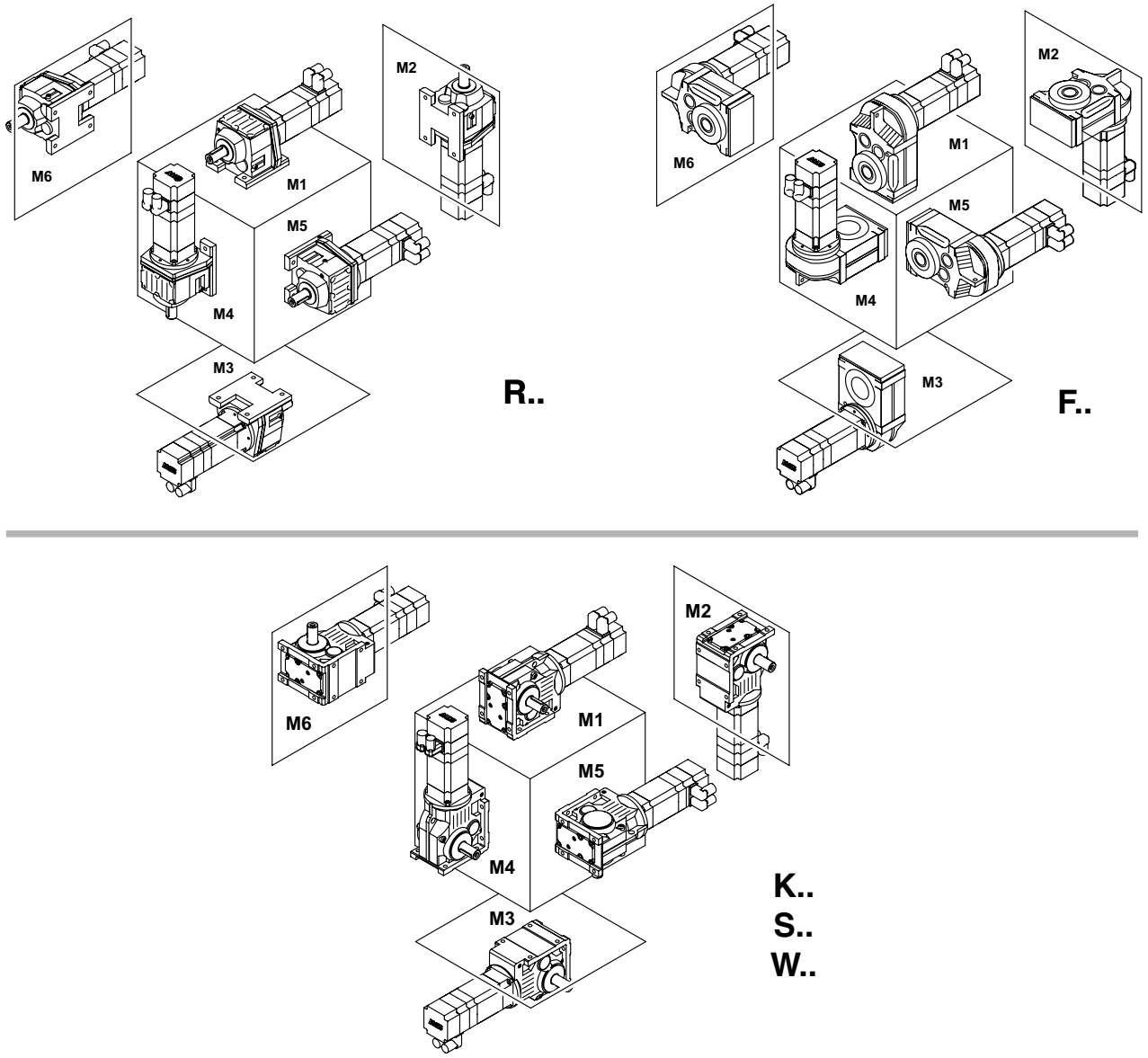

Figure 9: Depiction of mounting positions M1 ... M6

5.2 Order information for servo gearmotors – R, F, K, S, W gear units

	NOTE
	The following order information is required for R, F, K and S gear units and gearmotors in addition to the mounting position to exactly determine the design of the drive. This information is also required for Spiroplan® gearmotors (W gearmotors) that do not depend on a particular mounting position.

Direction of rotation of the output shaft

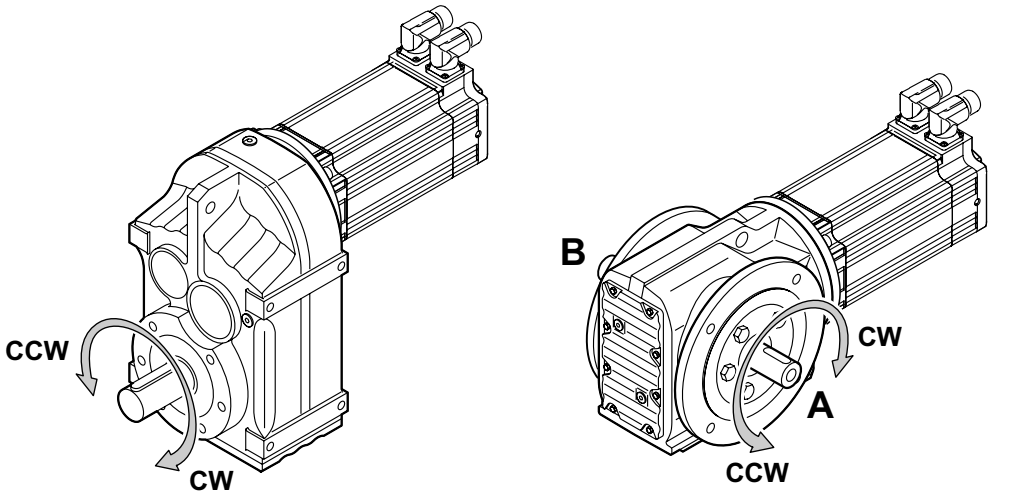

Figure 10: Output direction of rotation

As viewed at the output shaft: Clockwise (CW) = Rotating clockwise
Counterclockwise (CCW) = Rotating counterclockwise

Position of the output shaft and output flange

In right-angle gear units, you also have to indicate the position of the output shaft and the output flange:

- A or B or AB

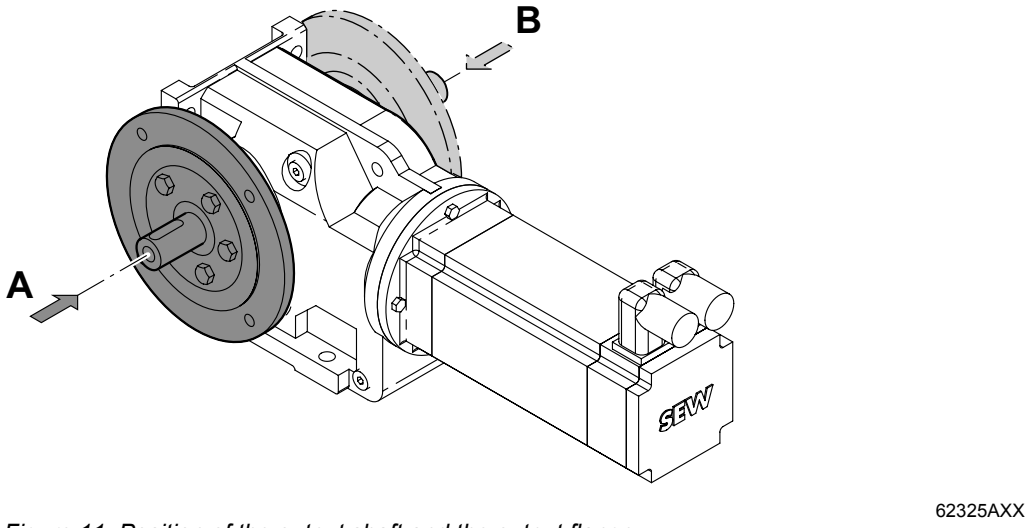

Figure 11: Position of the output shaft and the output flange

Position of output end in right-angle gear units

In shaft mounted right-angle gear units with a shrink disc, you also have to indicate whether the A or B side is the output end. In Figure 12 , the B side is the output end. The shrink disc is located opposite the output end, here on the A side.

In shaft mounted right-angle gear units, the "output end" is equivalent to the "shaft position" of right-angle gear units with solid shaft.

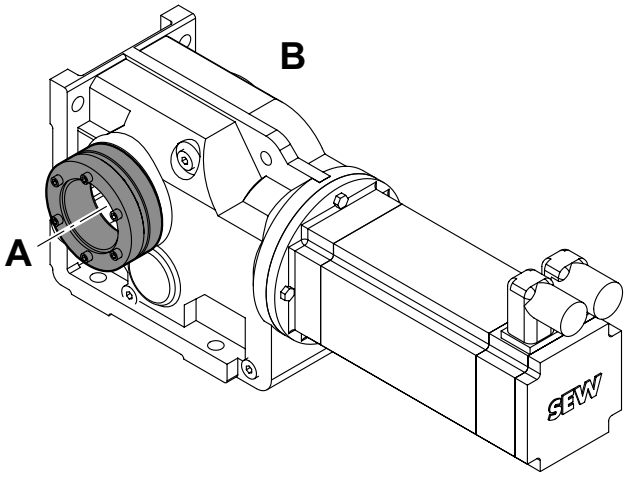

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Figure 12: Example: Position of the output end

	NOTE
	You will find the permitted mounting surfaces (= hatched area) in the mounting position sheets (page 82 ff). **Example:** Only the mounting surface at the bottom is possible with helical-bevel gear units K167/K187 in mounting positions M5 and M6.

Changing the mounting position

Make sure to read the following information when you operate the gearmotor in a mounting position other than the one indicated in the order:

- Adjust lubricant fill quantity to match the new mounting position
- Adjust position of breather valve
- For helical-bevel gearmotors: Contact the SEW-EURODRIVE customer service prior to changing to mounting position M5 or M6 and when changing from M5 to M6 or vice versa.
- For helical-worm gearmotors: Contact the SEW-EURODRIVE customer service when changing to mounting position M2 or M3.

5.3 General notes on mounting positions – BS.F, PS.F, PS.C gear units

Mounting position designations for BS.F.. helical-bevel gear units

In the case of gear units, SEW-EURODRIVE distinguishes between mounting positions M1 to M6. The following figure shows the spatial orientation of the gear unit in mounting positions M1 to M6 with the output end A.

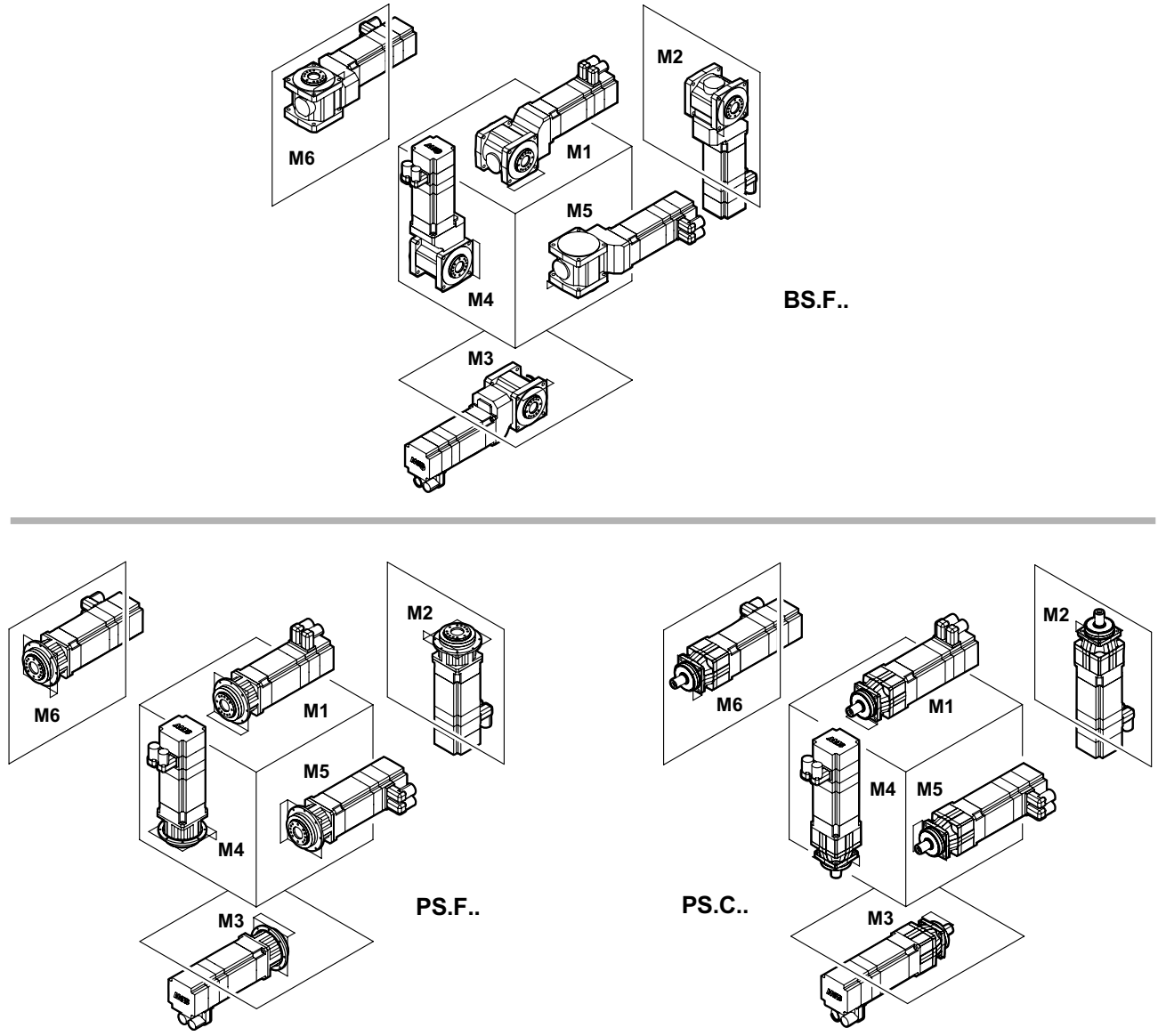

Figure 13: Visual representation of mounting positions

5.4 Order information for servo gearmotors – BS.F, PS.F, PS.C gear units

Definition of sides A and B for the output shafts

When installing the gear unit via one of the output flanges, the gear unit must be attached to the shaft output side via the B5 output flange.

Gear unit type	Position		Installation
	of the output shaft	of the shrink disc	
BSF.. / BSKF.. / BSBF	A side	--	Mounting via B5 flange on the A end
	B side	--	Mounting via B5 flange on the B side
BSHF..	--	B side	Mounting via B5 flange on the A side
	--	A side	Mounting via B5 flange on the B side
BSHF.. /I	--	A side	Mounting via B5 flange on the A side
	--	B side	Mounting via B5 flange on the B side
BSAF..	A side		Mounting via B5 flange on the A side
	B side		Mounting via B5 flange on the B side
BSF../BSKF..	AB	--	--

For BSF.. helical-bevel servo gear units, the position of the output shaft A, B or AB (→Figure 14) must be specified.

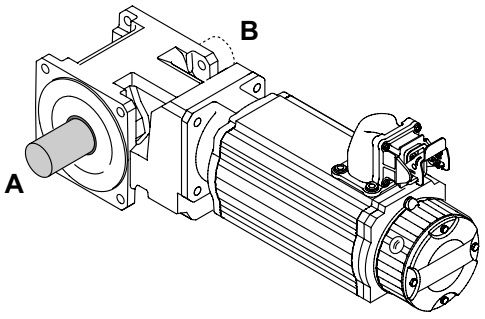

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Figure 14: Position of the output shaft of B.F.., BSKF.., BSAF.., BSBF.. helical-bevel gear units

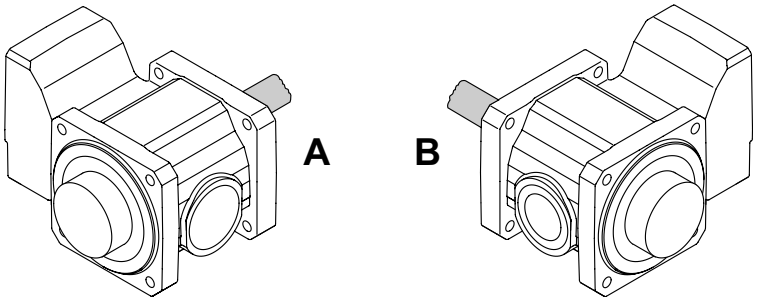

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Figure 15: Position of output shaft and output flange for BSHF.. helical-bevel gear units

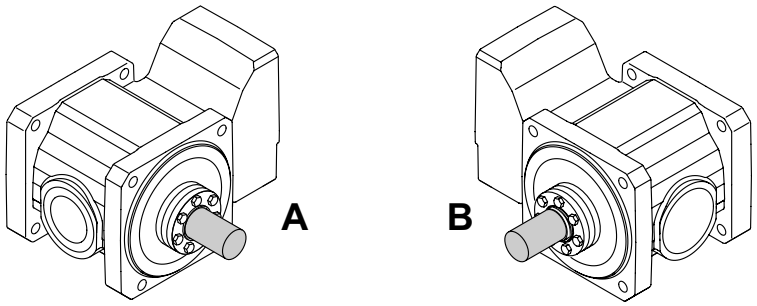

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Figure 16: Position of output shaft and output flange for BSHF../I helical-bevel gear units

Direction of rotation of the output shaft

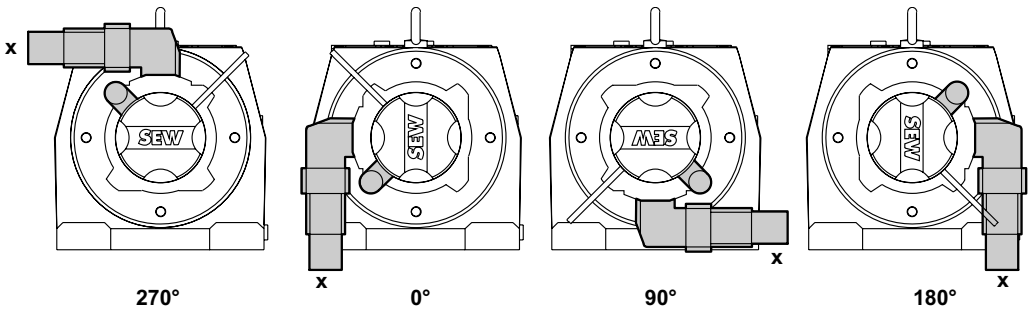
For a definition of the output shaft, see page 67.

5.5 Order information for servomotors

Plug connectors for CFM motors

Position of the power plug connector and the cable entry of CFM motors

Possible positions of the power plug connector are 0°, 90°, 180° or 270° as viewed onto the non-drive end of the motor (onto the fan end).



62884axx

Figure 17: Position "X" of the power plug connector of CFM motors

Position of the cable entry of CFM motors

Positions "X", "1", "2" or "3" are possible with CFM motors ("X" = standard).

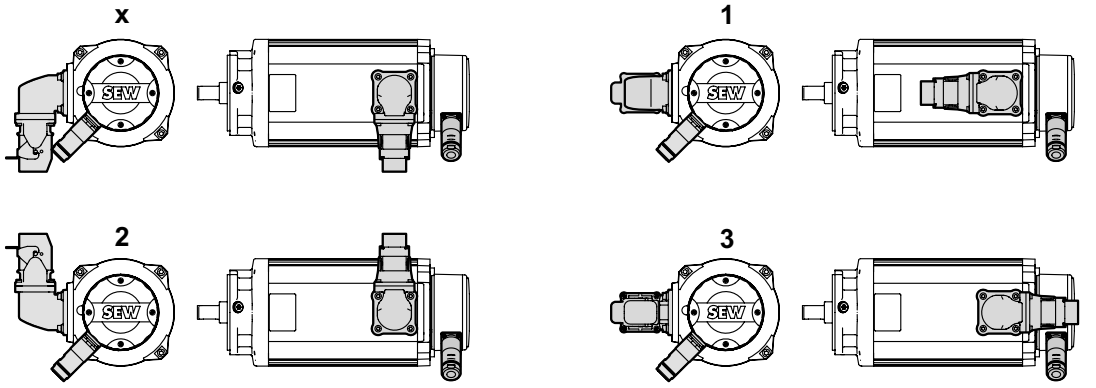


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Figure 18: Cable entry position for CM..S.5

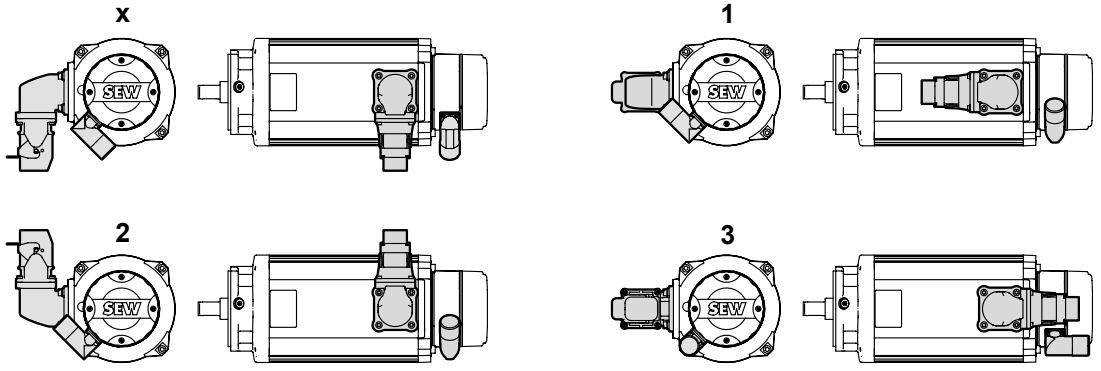

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Figure 19: Cable entry position for CM..S.6

Unless indicated otherwise, you will receive the power plug connector type 270° position with cable entry "3" and radial encoder plug (CM..S.5).

Cable entry of CFM motors with plug connector

	R27	R37	R47	R57	R67	R77	R87	R97	R107
CM71S	D	D	G	G	G	G	-	-	-
CM71M	D	D	G	G	G	G	-	-	-
CM71L	D	D	D	F	G	G	-	-	-
CM90S	D	D	D	D	E	F	G	G	-
CM90M	-	-	D	D	D	F	G	G	-
CM90L	-	-	D	D	D	D	F	G	-
CM112S	-	-	D	D	D	D	F	G	G
CM112M	-	-	-	-	D	D	F	G	G
CM112L	-	-	-	-	-	D	D	D	G

	F27	F37	F47	F57	F67	F77	F87	F97	F107
CM71S	E	E	F	F	F	G	-	-	-
CM71M	E	E	E	F	F	G	-	-	-
CM71L	E	E	E	F	F	G	-	-	-
CM90S	E	E	F	E	E	F	G	G	-
CM90M	-	-	-	E	E	E	G	G	-
CM90L	-	-	-	E	E	E	G	G	-
CM112S	-	-	-	E	E	E	F	G	G
CM112M	-	-	-	-	E	E	F	G	G
CM112L	-	-	-	-	-	E	E	F	G

	K37	K47	K57	K67	K77	K87	K97	K107
CM71S	E	E	E	F	G	-	-	-
CM71M	E	E	E	F	G	-	-	-
CM71L	D	E	E	E	G	-	-	-
CM90S	D	E	E	E	F	G	G	-
CM90M	-	D	E	E	E	G	G	-
CM90L	-	-	D	D	D	E	G	-
CM112S	-	-	D	D	E	E	G	G
CM112M	-	-	-	D	D	E	G	G
CM112L	-	-	-	-	D	D	E	G

	S37	S47	S57	S67
CM71S	D	E	G	G
CM71M	D	E	G	G
CM71L		D	D	G
CM90S	-	D	D	E
CM90M	-	-	-	E
CM90L	-	-	-	D
CM112S	-	-	-	D

The key for the tables is listed on the following page.

	**NOTE**
	There may be collisions depending on what the customer has installed on the output end.

"-" means:

- Gear unit/motor combination not possible.

D means:

- Cable entry positions "1", "2", "3", "X" are possible.

E means:

- Cable entry positions "2", "3", "X" are possible.
- Cable entry position "1" only possible at 0°, 180°, 270°.

F means:

- Cable entry positions "2", "3", "X" are possible.
- Cable entry position "1" only possible at 270°.

G means:

- Cable entry positions "2", "3", "X" are possible.
- Cable entry position "1" is not possible.

Cable entry position is defined on page 72 .

NOTE

Caution: Not all connector positions are possible when mounting BS.F helical-bevel gear units.

All cable entry positions are possible when mounting PS.F planetary gear units.

	BS.F302	BS.F402	BS.F502	BS.F602	BS.F802
CM71S	D	D	D	D	-
CM71M	D	D	D	D	-
CM71L	-	D	D	D	-
CM90S	-	C	D	D	D
CM90M	-	C	D	D	D
CM90L	-	C	C	D	D
CM112S	-	-	C	D	D
CM112M	-	-	-	D	D
CM112L	-	-	-	C	D

"-" means:

- Gear unit/motor combination not possible.

C means:

- Cable entry positions "3", "2", "1", "X" are possible.

D means:

- Cable entry positions "3", "2", "X" are possible.
- Cable entry position "1" at 90° is not possible.

Cable entry position is defined on page 72 .

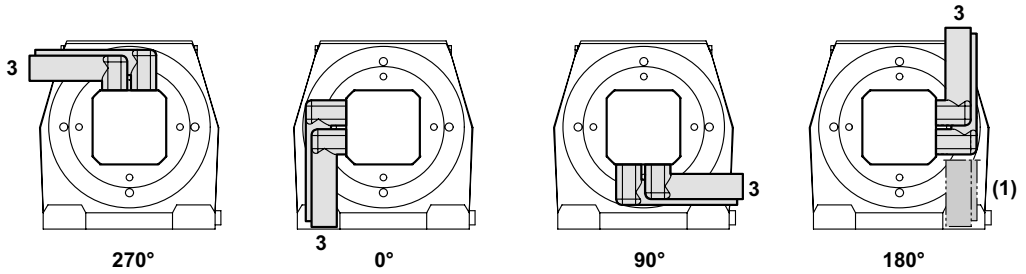
NOTE

Caution: It is not possible to mount a forced cooling fan to motors with axial encoder plug SM6./SB6.

Plug connectors for DFS motors

Position of the power plug connector and the cable entry of DFS motors

Possible positions of the power plug connector are 0°, 90°, 180° or 270° as viewed onto the non-drive end of the motor (onto the fan end).



62883axx

Figure 20: Position "3" of the power plug connector of DFS56H motors and DFS56 brakemotors

	NOTE
	If connector position "3" is unfavorable at 180° (cables on top), position "1" can be selected instead.

Position of the cable entry of DFS motors

Positions "2" and "X" are possible for DFS56M and DFS56L motors ("X" = standard).

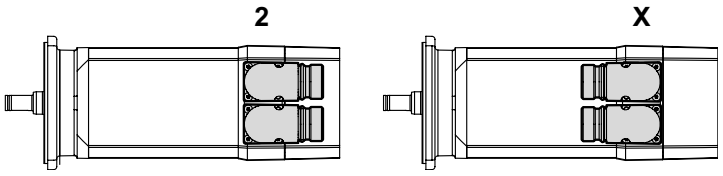


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Figure 21: Cable entry position for DS56M/L

Positions "1", "2", "3" and "X" are possible for DFS56H and DFS brake motors.

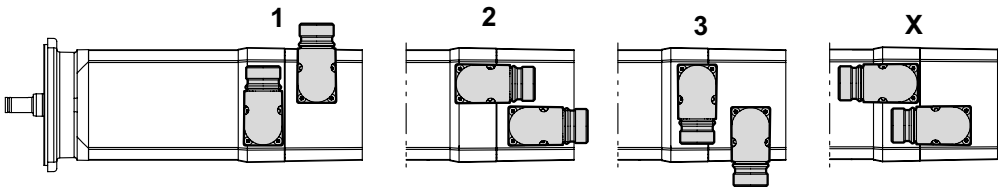

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Figure 22: Cable entry position for DS56H

Unless indicated otherwise, you will receive the power plug connector type 270° position with cable entry "2".

Cable entry of DFS motors with plug connector

R F K S	R27 F27	R37 F37 K37 S37	R47-R67	F57-F67	K47-K67	F47 S47	S57	S67
DS56M	A	A	-	-	-	A	A	-
DS56L	A	A	-	-	-	A	A	-
DS56H	B	B	C	C	C	B	B	C

NOTE

There may be collisions depending on what the customer has installed on the output end.

"-" means:

- Gear unit/motor combination not possible.

A means:

- Cable entry position "2" is possible.
- Cable entry positions "1" and "3" are possible for brake motors.

B means:

- Cable entry positions "1", "2", "3" are possible.
- Cable entry position "X" only possible at 270°.

C means:

- Cable entry positions "1", "2", "3" are possible.
- Cable entry position "X" is not possible.

Cable entry position is defined on page 76 .

	NOTE
	Caution: Not all connector positions are possible when mounting BS.F helical-bevel gear units. All cable entry positions are possible when mounting PS.F planetary gear units.

	BS.F202	BS.F302	BS.F402
DS56M	A	A	A
DS56L	A	A	A
DS56H	B	B	B

A means:

- Cable entry positions "2" and "X" are possible.
- Cable entry positions "1" and "3" are possible for brake motors.
- Cable entry position "X" at 90° is not possible.

B means:

- Cable entry positions "3", "2", "1", "X" are possible.
- Cable entry position "X" at 90° is not possible.

Cable entry position is defined on page 76 .

Terminal box

Position of motor terminal box and cable entry

The product standard EN 60034 specifies that the following designations have to be used for terminal box positions:

- As viewed onto the output shaft = A-end
- Designation as R (right), B (bottom), L (left) and T (top)

This new designation applies to motors without a gear unit in mounting position B3 (= M1). The previous designation is retained for gearmotors.

The position of the motor terminal box has so far been specified indicated with 0°, 90°, 180° or 270° as viewed onto the fan guard = B-end.

Figure 23 shows both designations. Where the mounting position of the motor changes, "R", "B", "L" and "T" are rotated accordingly.

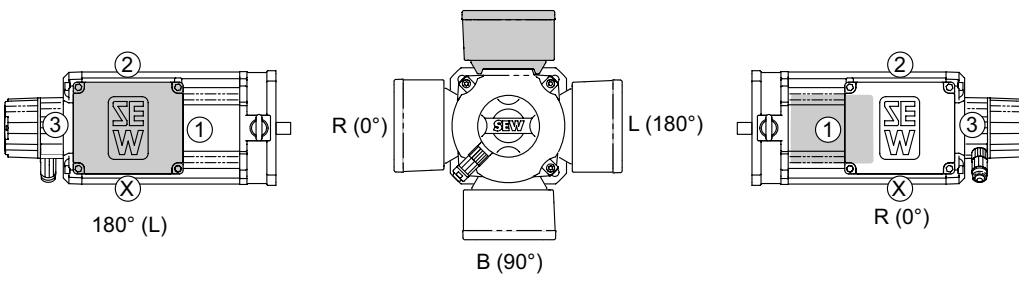


Figure 23: Position of terminal box and cable entry

Unless indicated otherwise, you will receive the terminal box type 0° with "X" cable entry, see page 72.

We recommend selecting cable entry "2" with mounting position M3.

NOTE

- The terminal box can only be rotated with the entire motor: 0°, 90° and 180°.
- The terminal box has a cable entry with positions "2", "3" and "X".
- The CM112H synchronous servomotor can only be ordered with terminal box.

Terminal box position	R (0°)	B (90°)	L (180°)	T (270°)
Possible cable entries	X, 3	X, 1, 3	1, 2	X, 1, 3

Plug connectors of CMP servomotors

Servomotors of the CMP series are equipped with adjustable or radial connectors. There is no variant with a terminal box.

Position of the cable entry of CMP motors

Position "adjustable" has been defined for right-angle, rotatable connectors. This is the standard connector position. It corresponds to connector position "3".

Position "radial" has been defined for the straight connector housing (radial output). Radial connectors are optional.

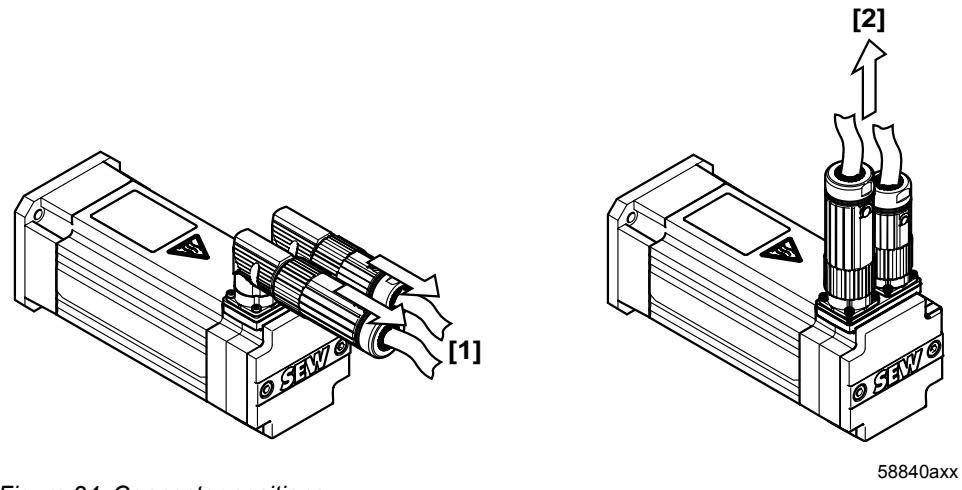


Figure 24: Connector positions

[1] Connector position "adjustable"

[2] Connector position "radial"

The CMP motors are supplied with right-angle connectors in position "adjustable" as standard.

The right-angle connectors can be rotated to achieve all position.

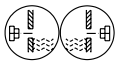
NOTE

The connector should only be rotated to install and connect the motor. Do not turn the connector regularly once it has been installed.

5.6 Key to the mounting position sheets

Symbols used

The following table shows the symbols used in the mounting position sheets and their meaning:

Symbol	Meaning
	Breather valve
	Oil level plug[1)]
	Oil drain plug
③	Cable entry position "3"

1) Does not apply to the first gear unit (larger gear unit) of multi-stage gear units.

NOTE

Notes on the shafts displayed in the mounting position sheets!

Note the following information regarding display of shafts in the mounting position sheets:

- **For gear units with solid shaft:** The displayed shaft is always on the A end.
- **For shaft mounted gear units:** The shaft with dashed lines represents the customer shaft. The output end (= shaft position) is always shown on the A end.

NOTE

The Spiroplan® gearmotors are not dependant on the mounting position, except for W..37 in mounting position M4. However, mounting positions M1 to M6 are also shown for Spiroplan® gearmotors to assist you in working with this documentation.

Important! Please note:

Spiroplan® gearmotors W..10 to W..30 cannot be equipped with breather valves, oil level plugs or drain plugs.

Spiroplan® gearmotors W..37 can be equipped with breather valves in mounting position M4 and with oil drain plugs in mounting position M2.

NOTE

Notes on the displayed motors.

Motors are only represented symbolically in the mounting position sheets.

Churning losses

* → page XX

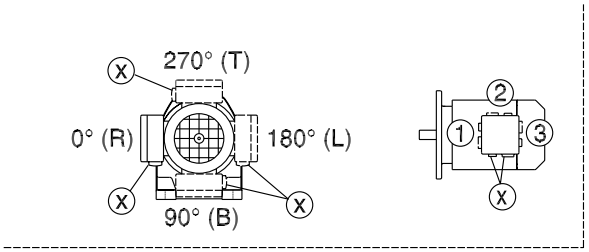
Churning losses may occur in some mounting positions. Contact SEW-EURODRIVE in case of the following combinations:

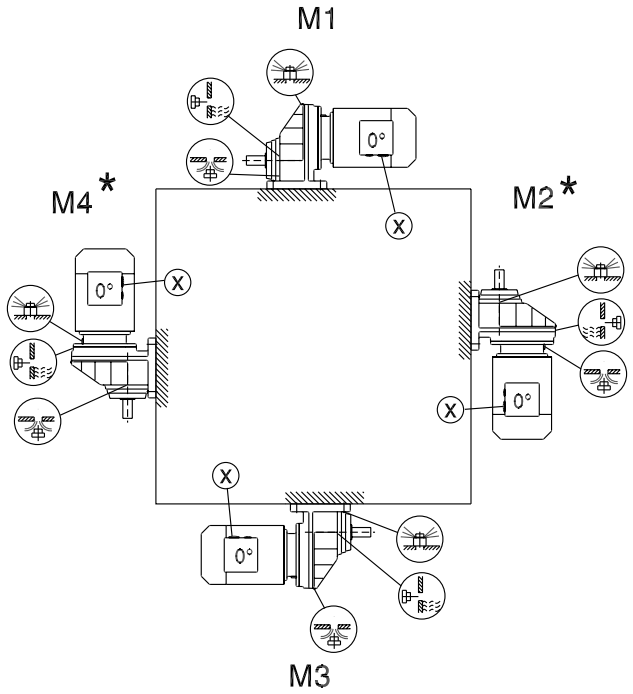
Mounting position	Gear unit type	Gear unit size	Input speed [rpm]
M2, M4	R	97 ... 107	> 2500
		> 107	>1500
M2, M3, M4, M5, M6	F	97 ... 107	> 2500
		> 107	> 1500
	K	77 ... 107	> 2500
		> 107	> 1500
	S	77 ... 97	> 2500

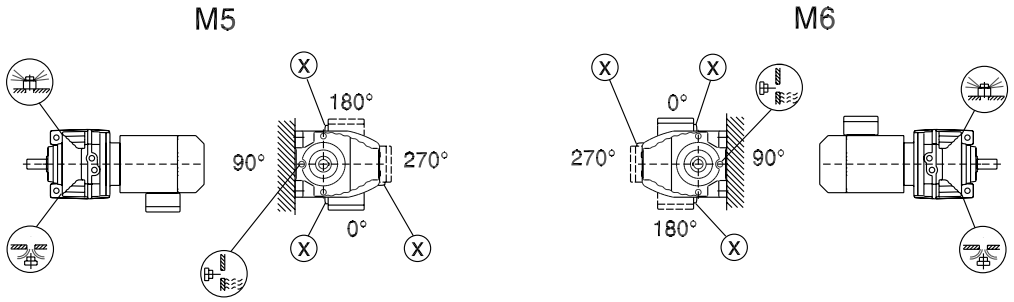
5.7 Mounting positions of helical gearmotors

RX57...RX107

04 043 02 00

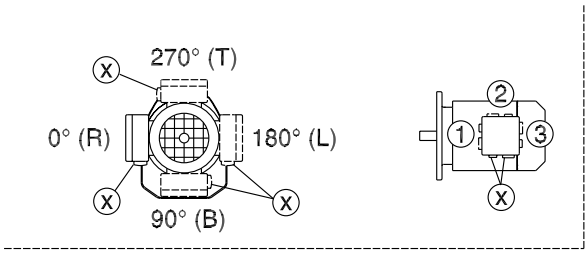


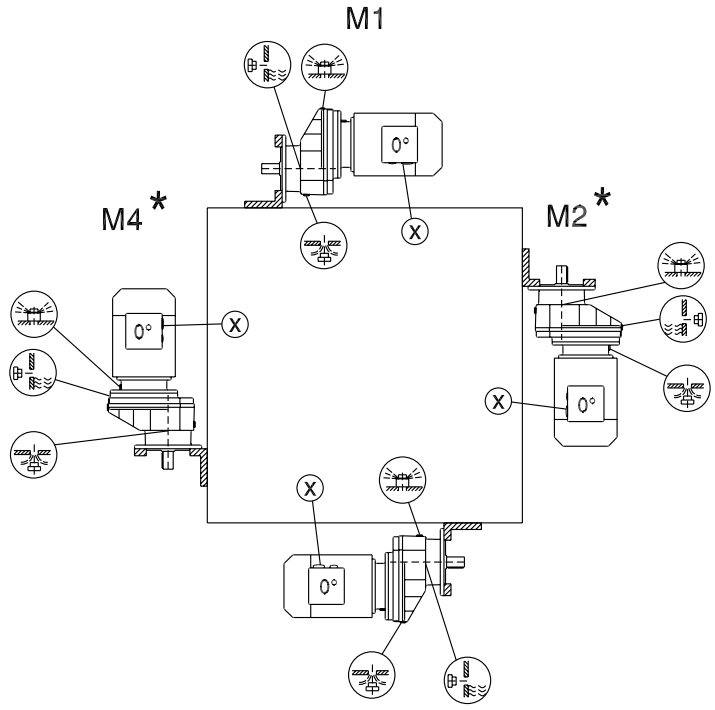


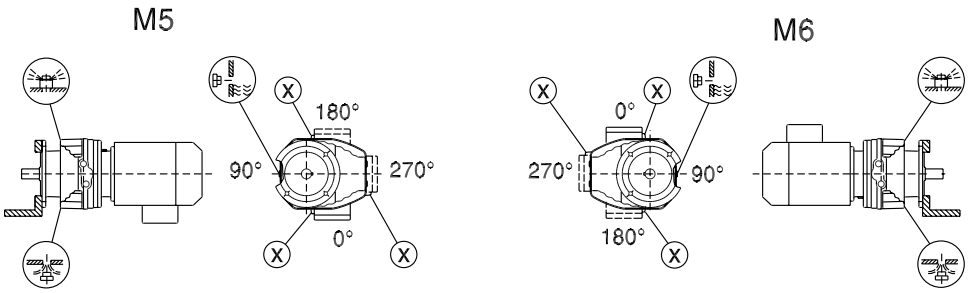


* → page 81

RXF57...RXF107



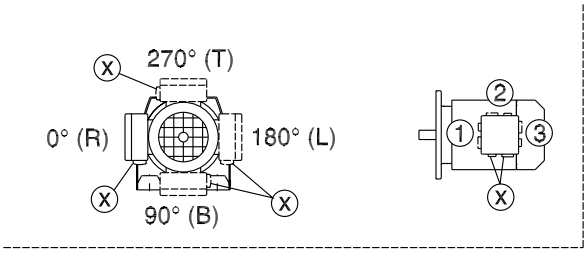


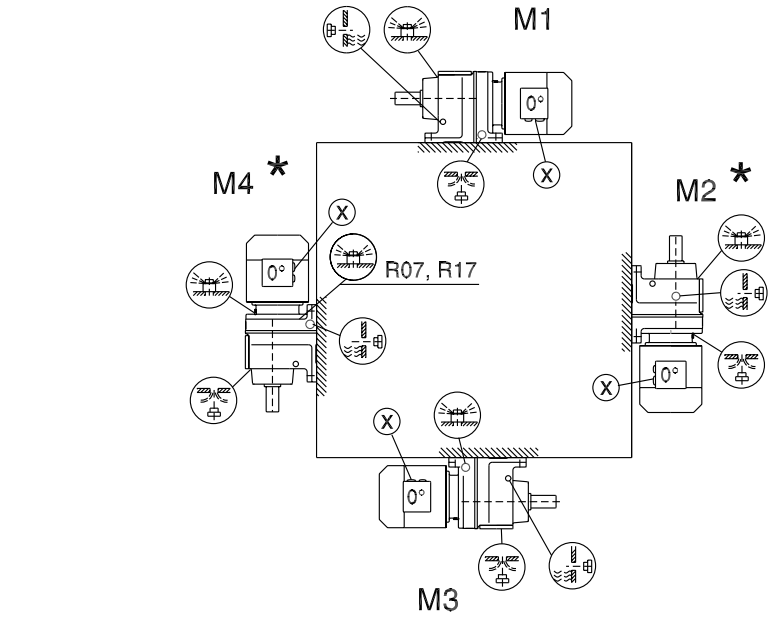


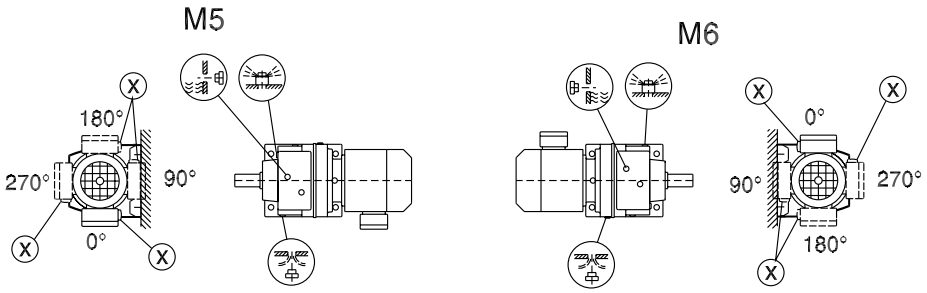
* → page 81

R07 ... R167

04 040 03 00





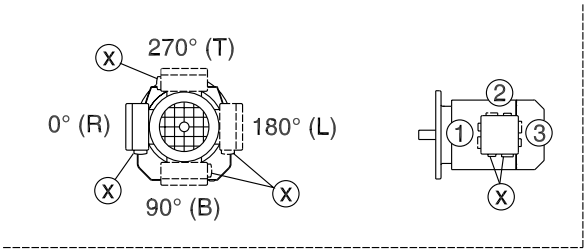


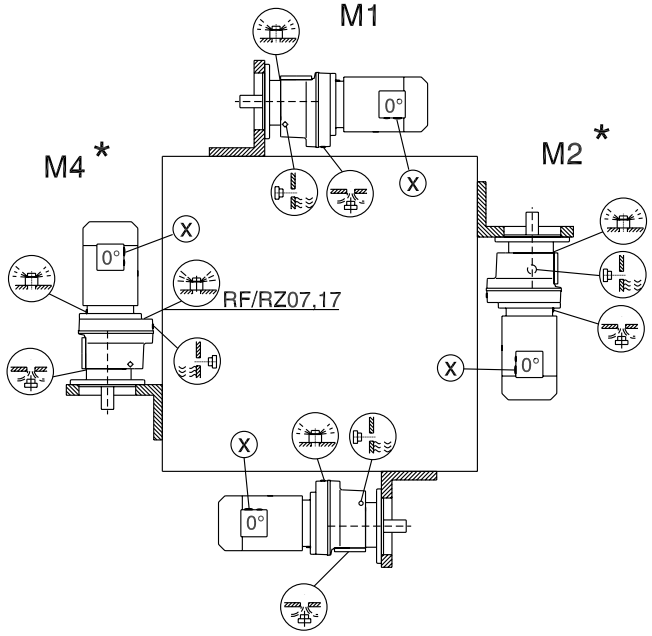
R07		M1, M2 , M3 , M5 , M6
R17, R27		M1, M3 , M5 , M6
R07, R17, R27		
R47, R57		M5

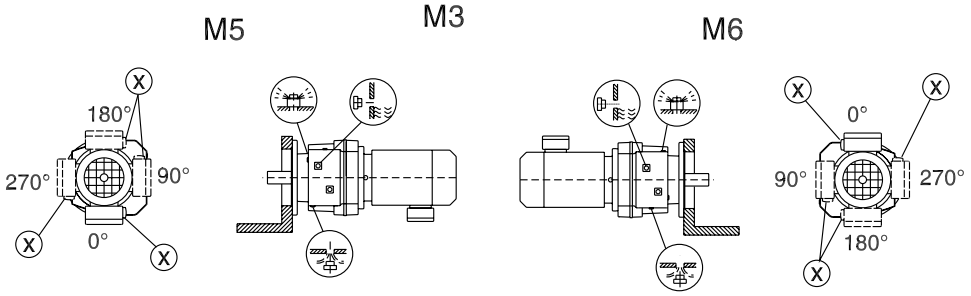
* → page 81

RF07...RF167, RZ07...RZ87

04 041 03 00





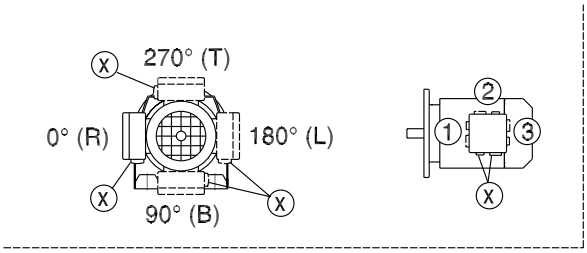


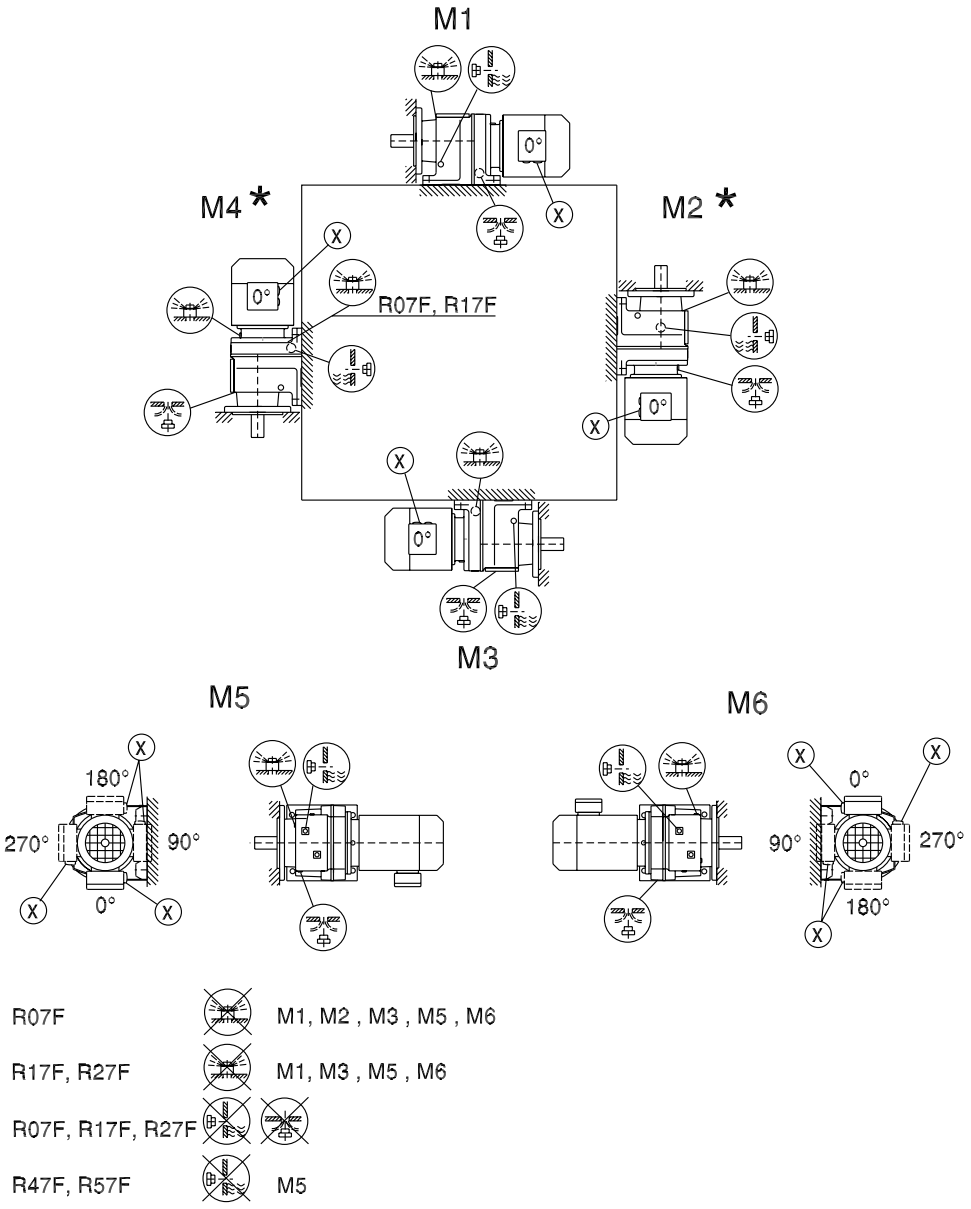
RF/RZ07		M1, M2 , M3 , M5 , M6
RF/RZ17,27		M1, M3 , M5 , M6
RF/RZ07, 17, 27		
RF/RZ47, 57		M5

* → page 81

R07F...R87F

04 042 03 00





R07F		M1, M2 , M3 , M5 , M6
R17F, R27F		M1, M3 , M5 , M6
R07F, R17F, R27F		
R47F, R57F		M5

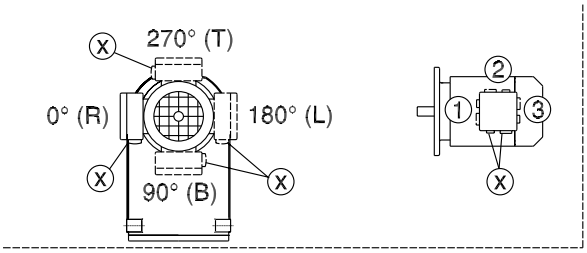
* → page 81

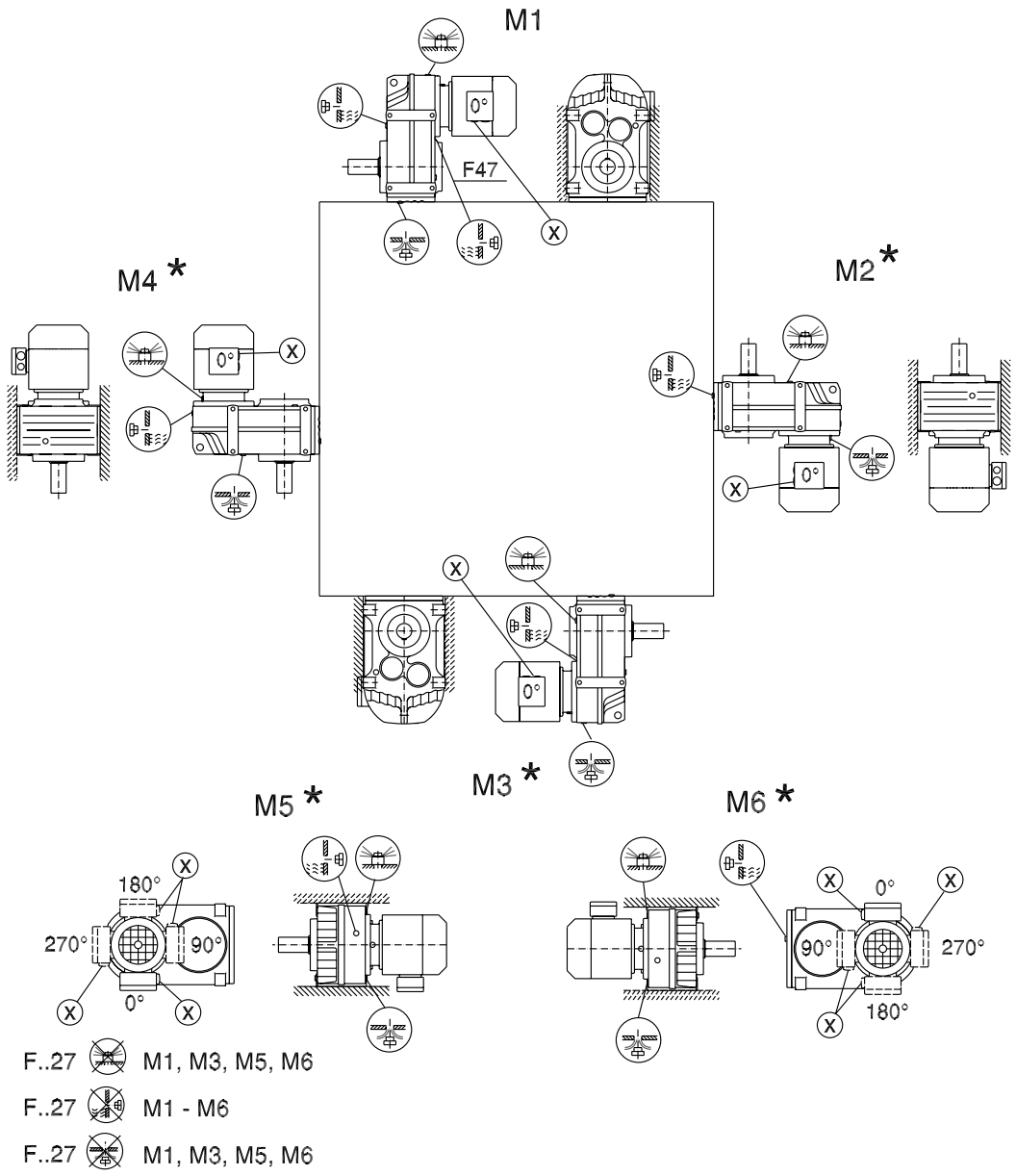
Caution: See the ⓘ notes in chapter "Project planning / Overhung and axial loads" (page 48).

5.8 Parallel shaft helical gearmotors

F/FA..B/FH27B...157B, FV27B...107B

42 042 03 00





F..27 M1, M3, M5, M6

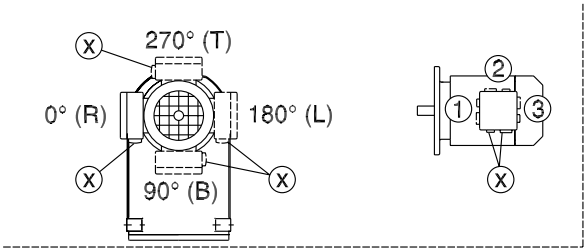
F..27 M1 - M6

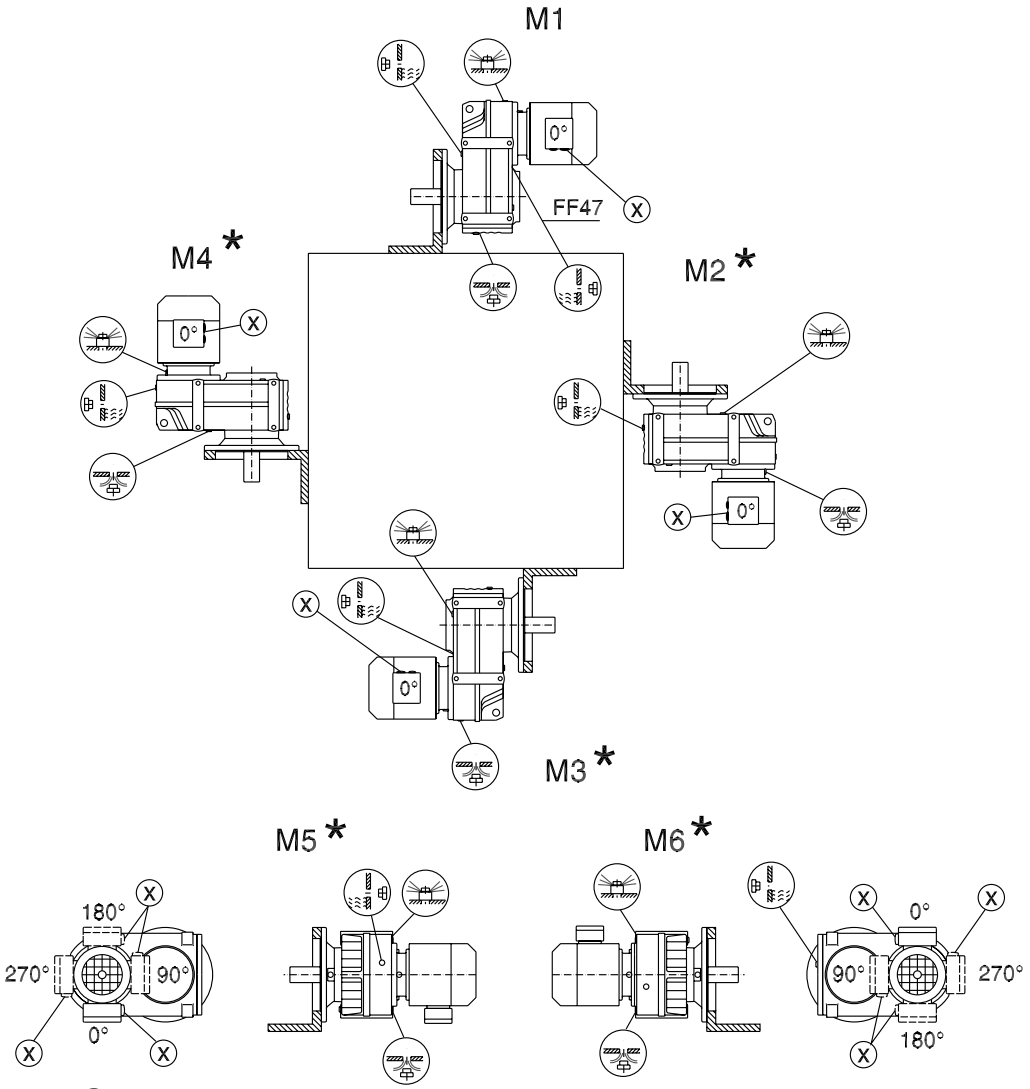
F..27 M1, M3, M5, M6

* → page 81

FF/FAF/FHF/FAZ/FHZ27...157, FVF/FVZ27...107

42 043 03 00





F..27 M1, M3, M5, M6

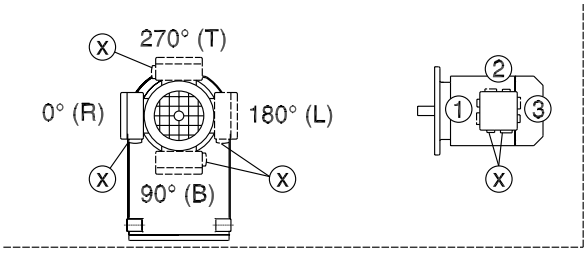
F..27 M1 - M6

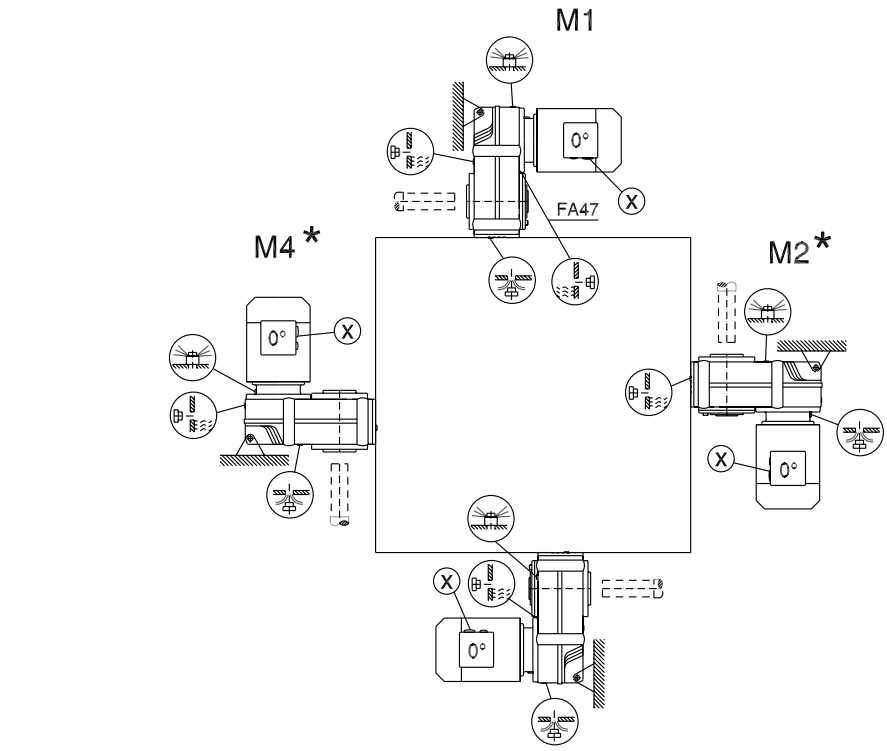
F..27 M1, M3, M5, M6

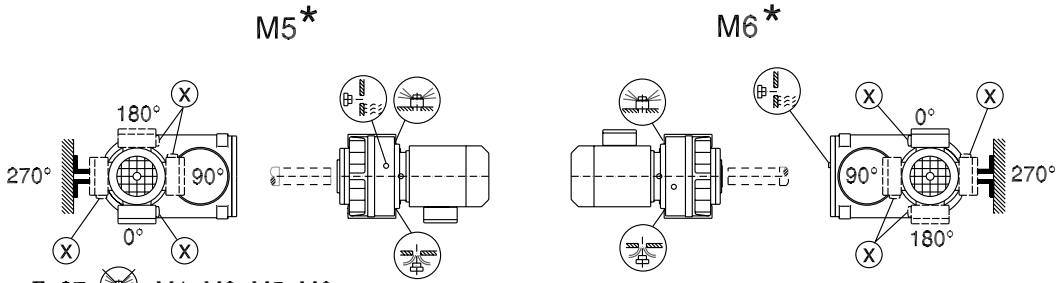
* → page 81

FA/FH27...157, FV27...107, FT37...97

42 044 03 00







F..27 M1, M3, M5, M6

F..27 M1 - M6

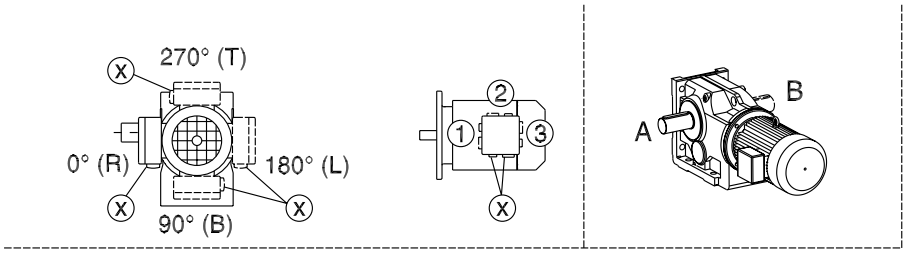
F..27 M1, M3, M5, M6

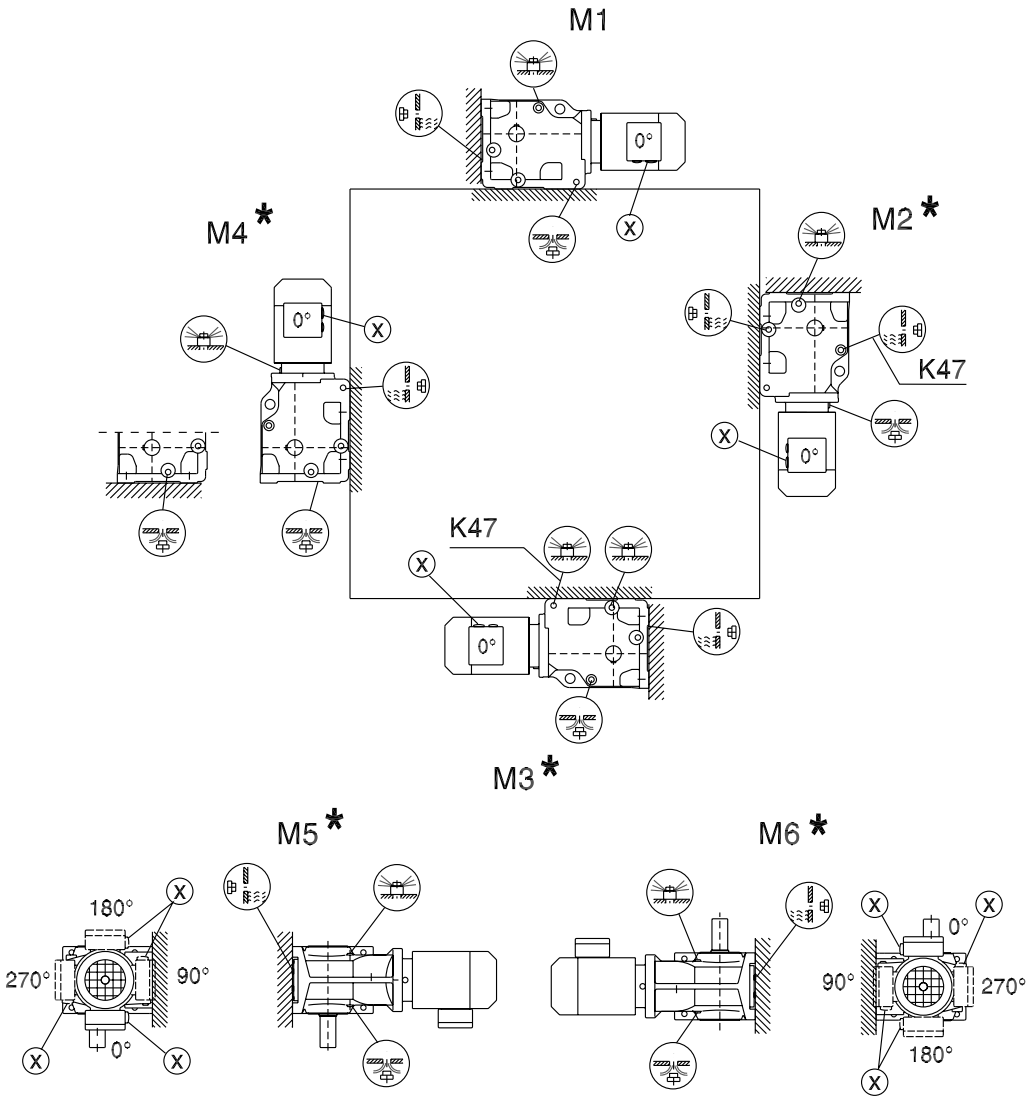
* → page 81

5.9 Mounting positions of helical-bevel gearmotors

K/KA..B/KH37B...157B, KV37B...107B

34 025 03 00



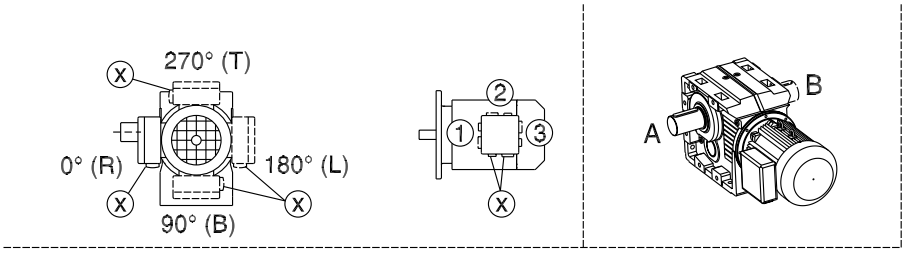


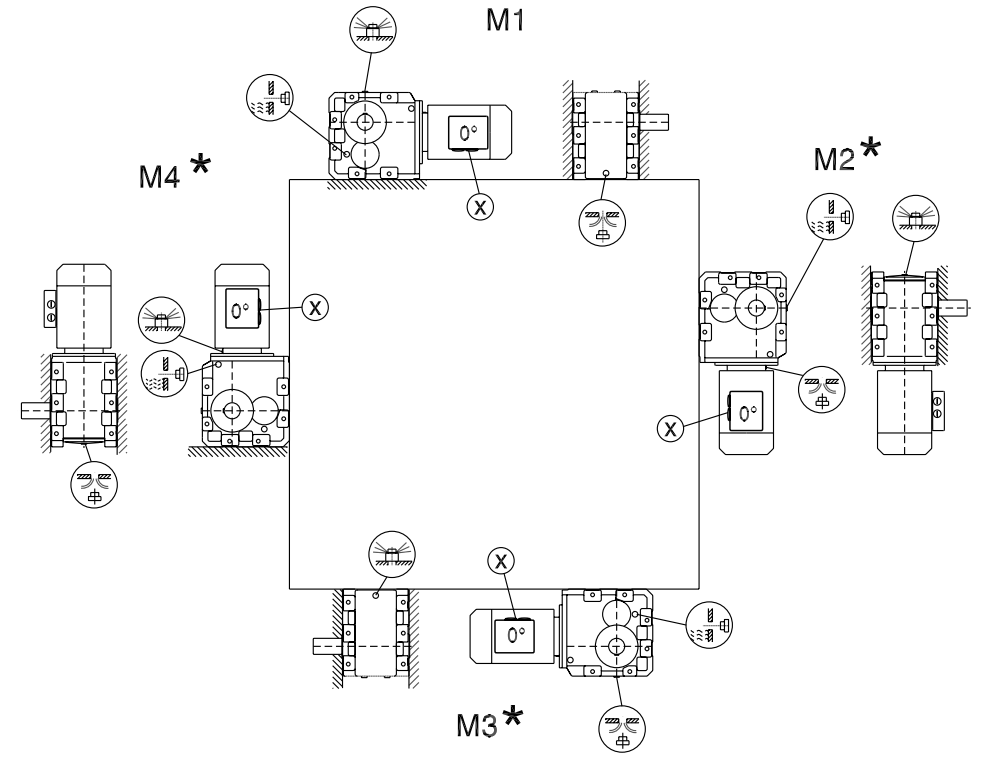
* → page 81

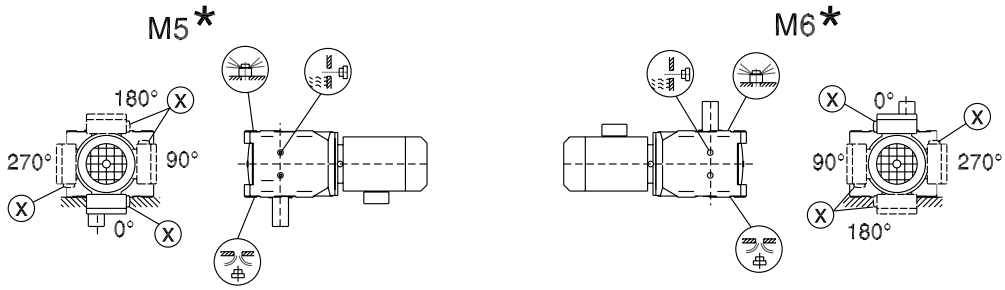
Caution: See the (i) notes in chapter "Project planning / Overhung and axial loads" (page 48).

K167...187, KH167B...187B

34 026 03 00



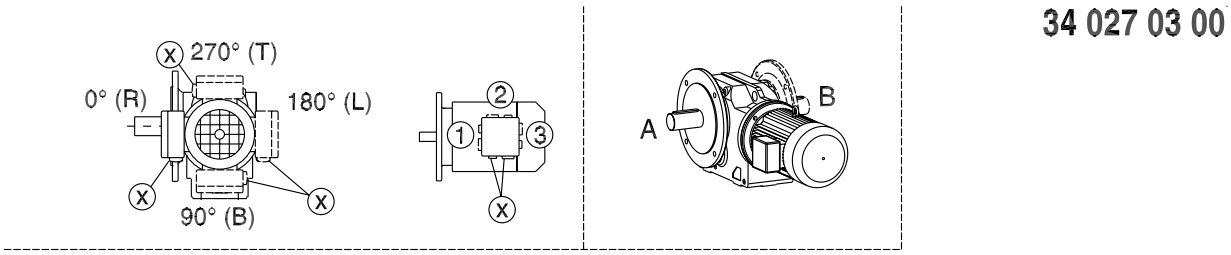


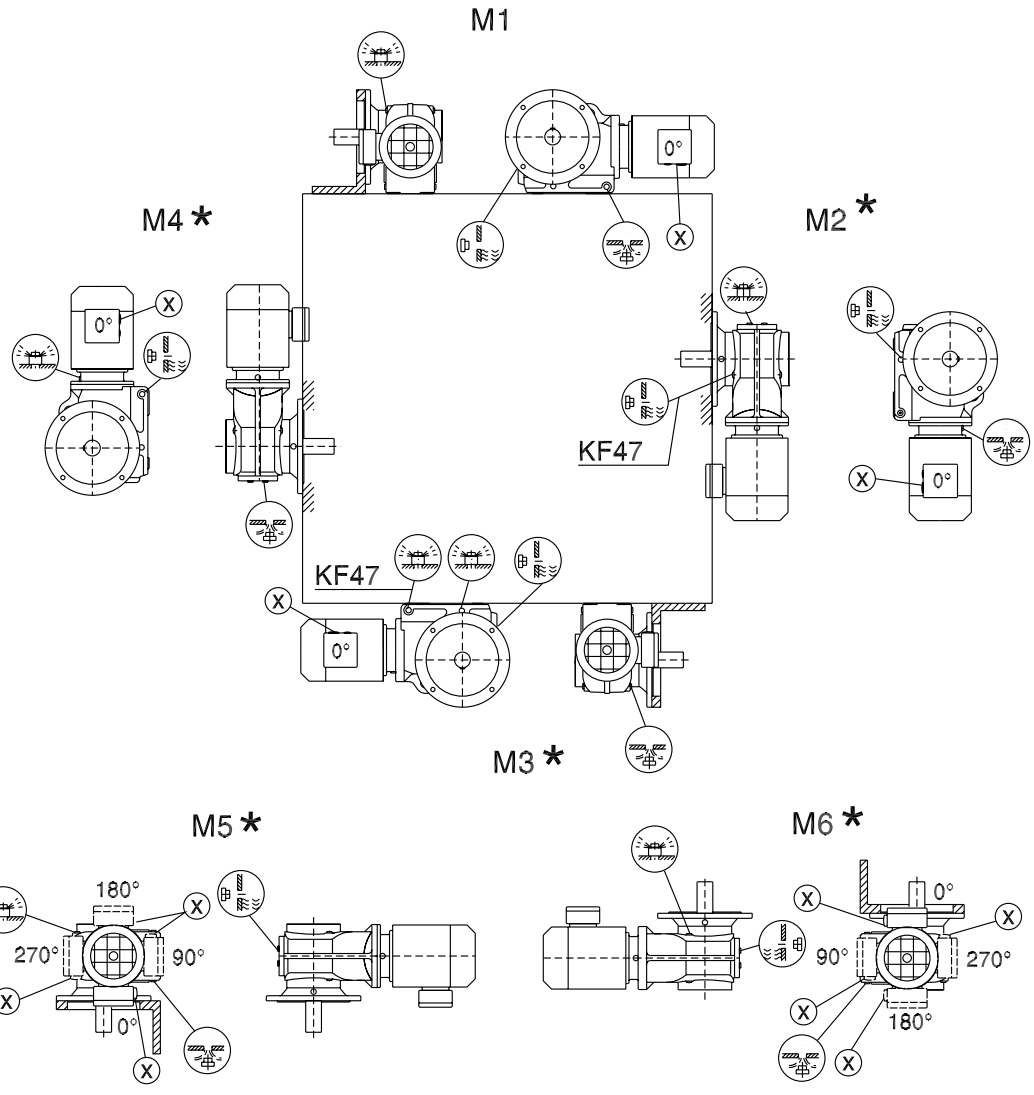


* → page 81

Caution: See the (i) notes in chapter "Project planning / Overhung and axial loads" (page 48).

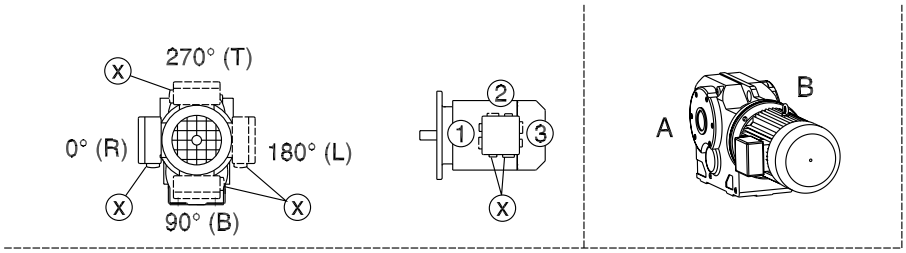
KF/KAF/KHF/KAZ/KHZ37...157, KVF/KVZ37...107

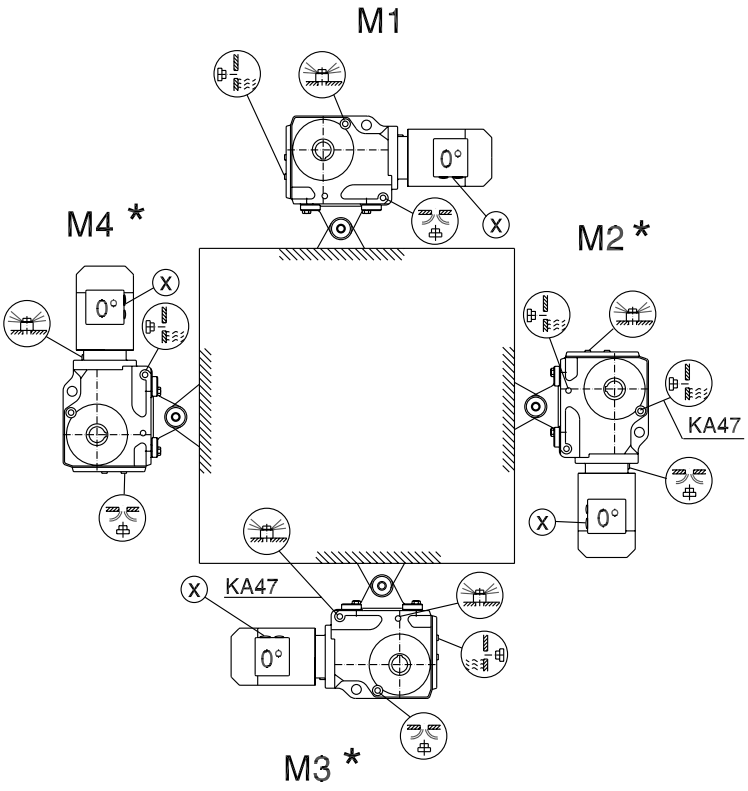


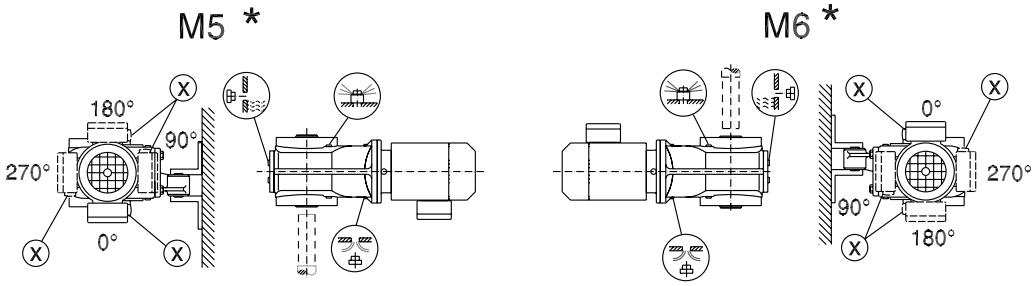


* → page 81

KA/KH37...157, KV37...107, KT37...97



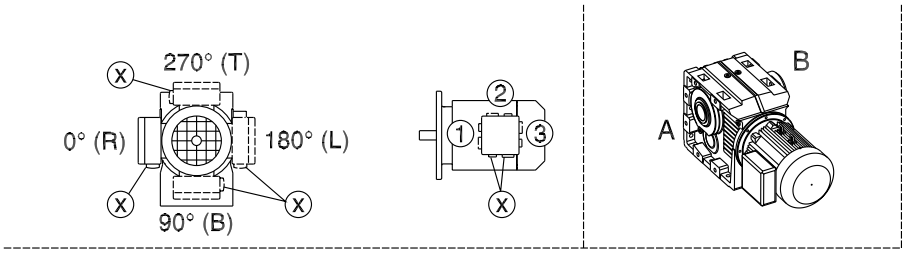


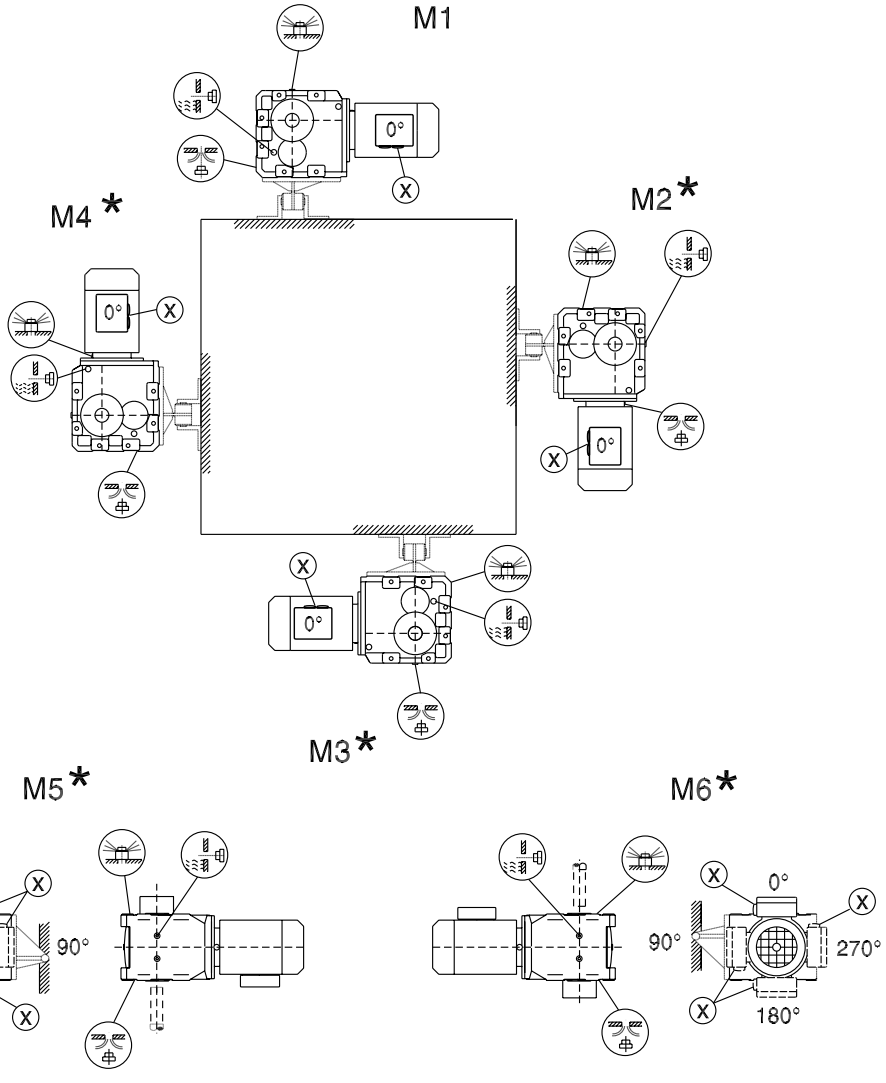


* → page 81

KH167...187

39 026 04 00

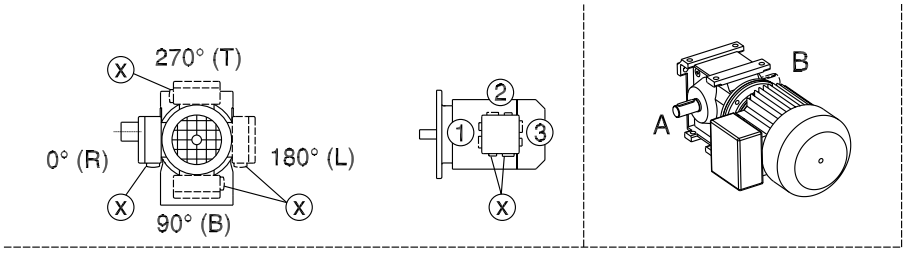




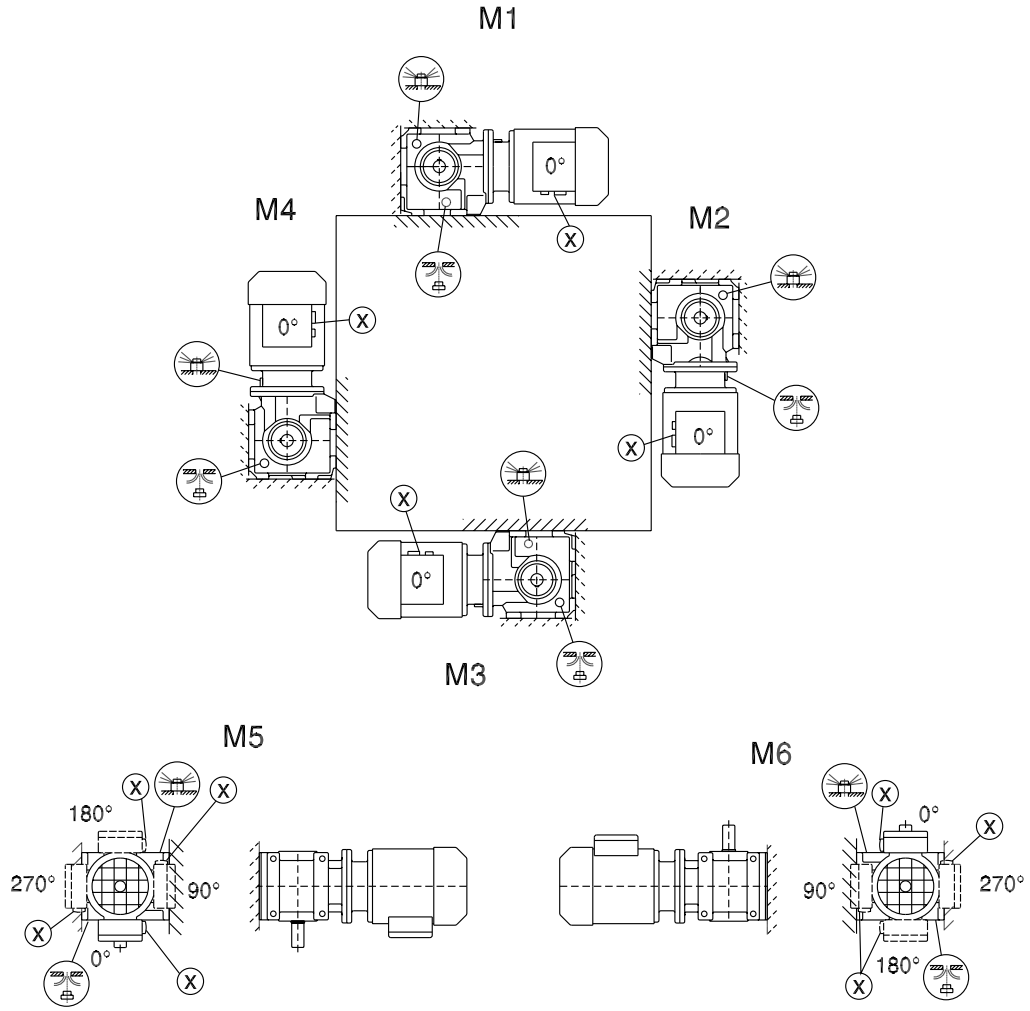
* → page 81

5.10 Mounting positions of helical-worm gearmotors

S37



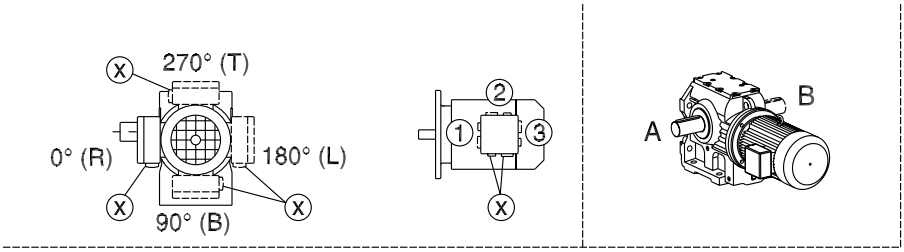
05 025 03 00

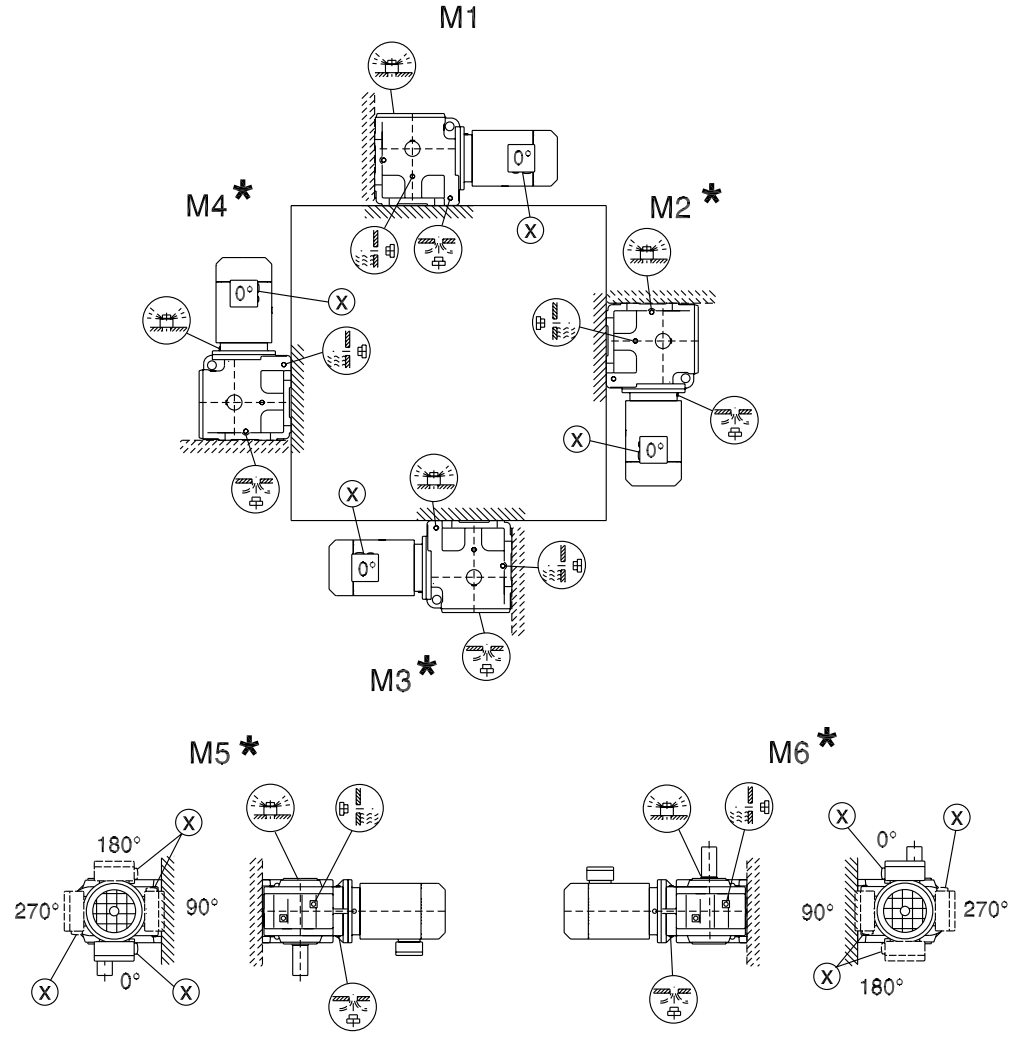


* → page 81

Caution: See the (i) notes in chapter "Project planning / Overhung and axial loads" (page 48).

S47...S97

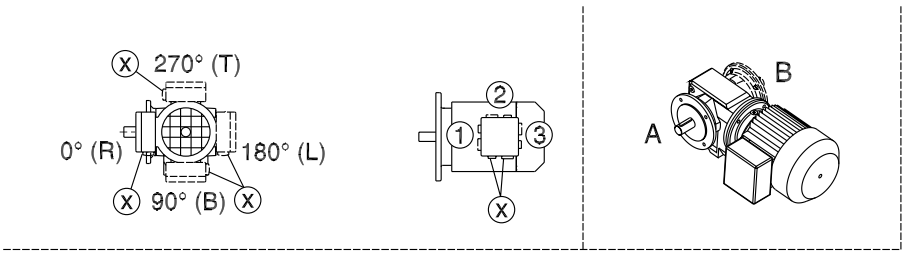


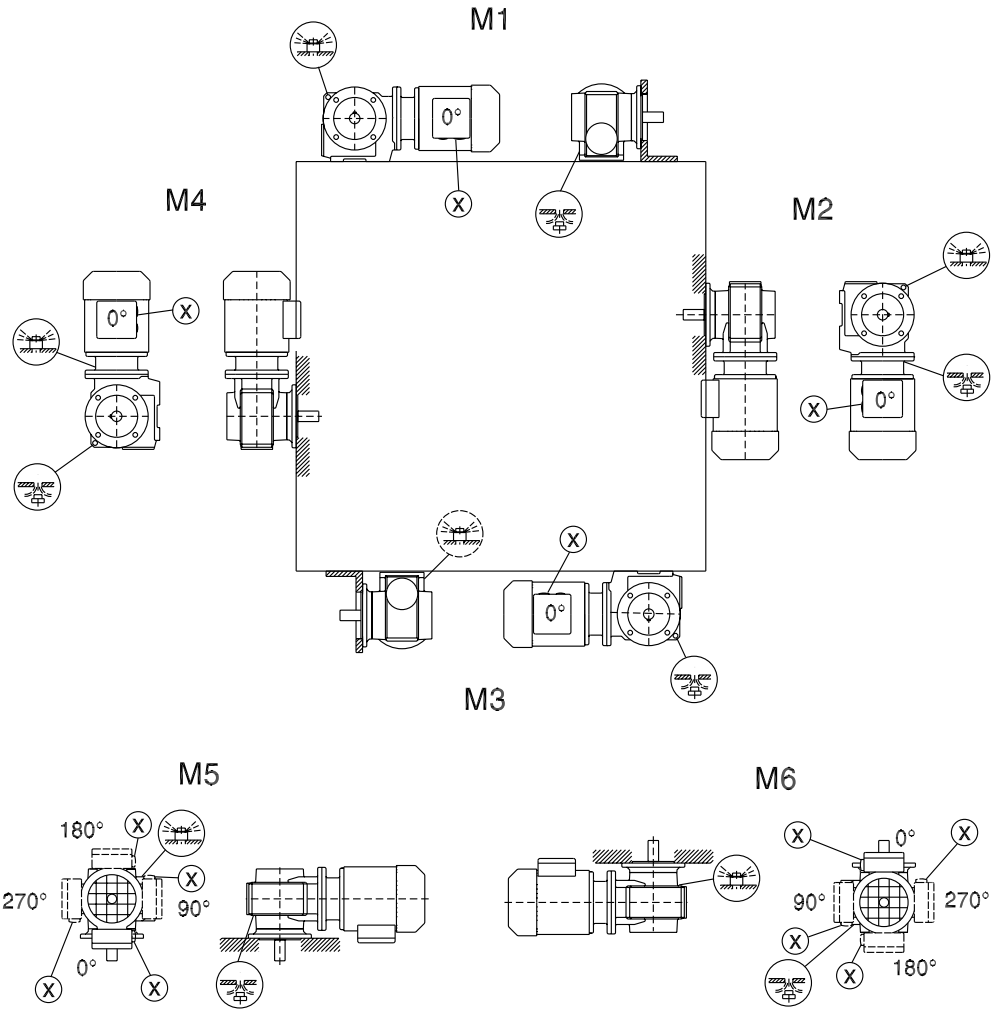


* → page 81

Caution: See the ⓘ notes in chapter "Project planning / Overhung and axial loads" (page 48).

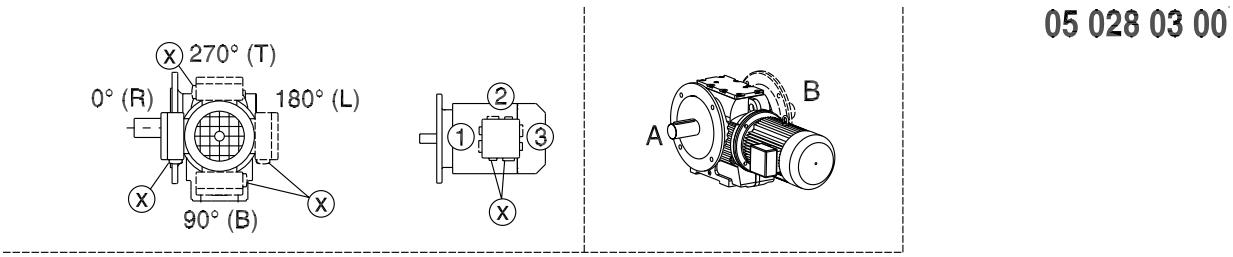
SF/SAF/SHF37

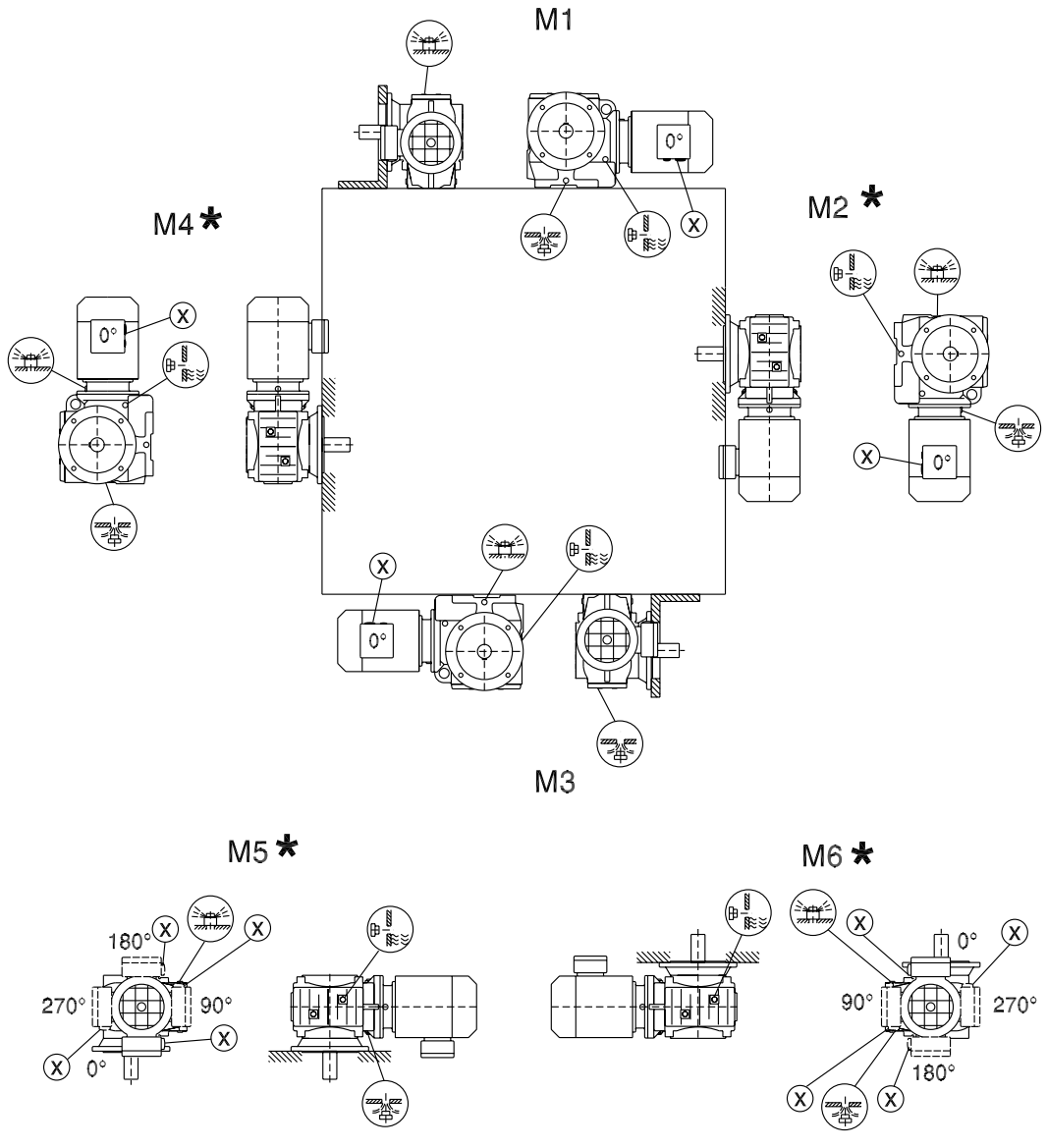




* → page 81

SF/SAF/SHF/SAZ/SHZ47...97

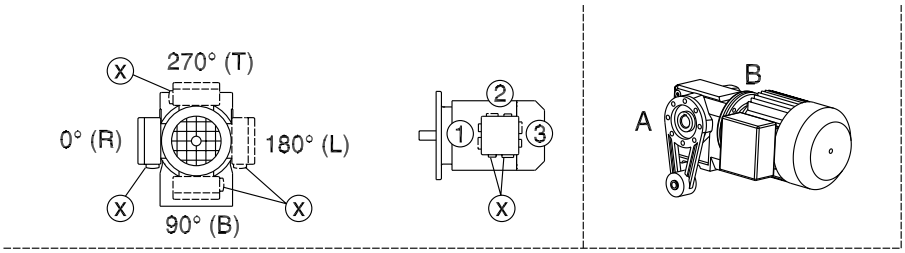


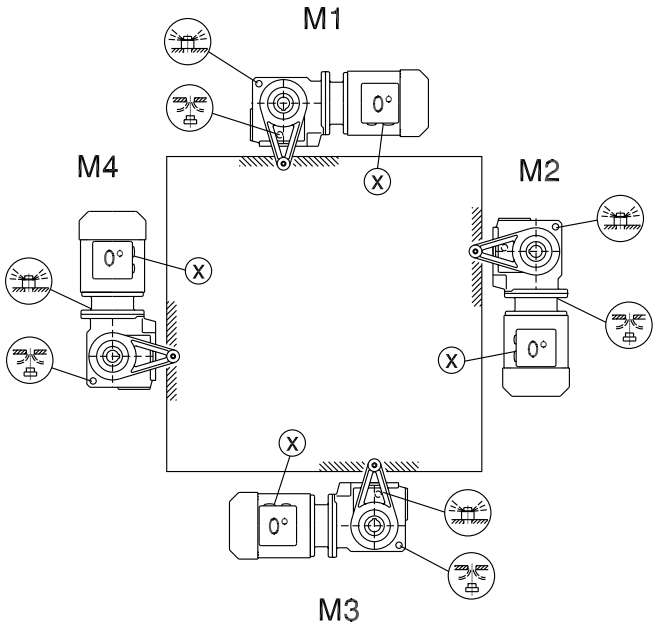


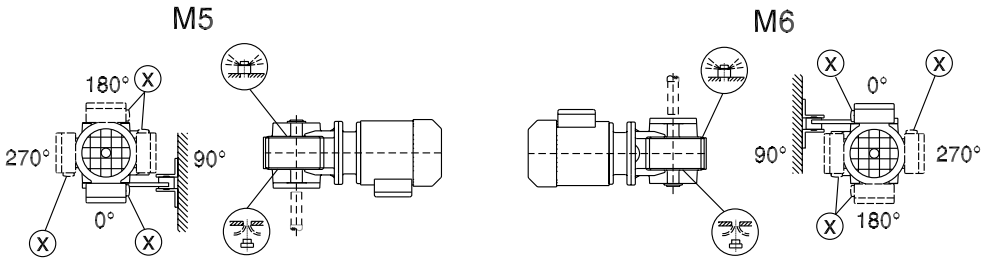
* → page 81

SA/SH/ST37

28 020 04 00



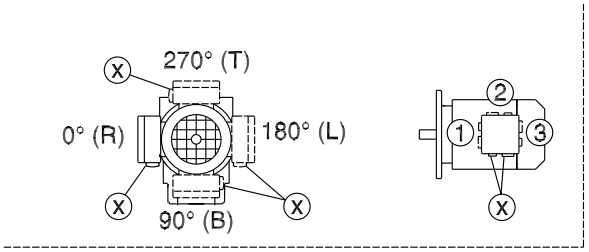


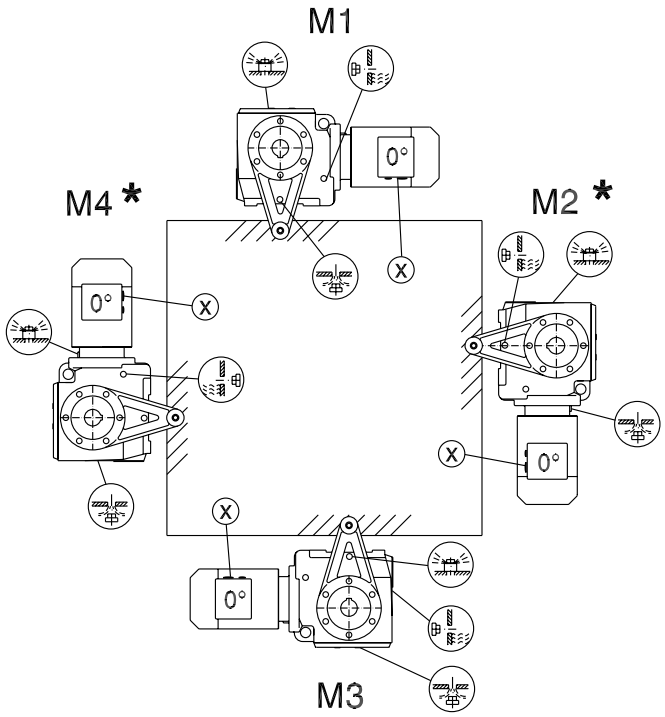


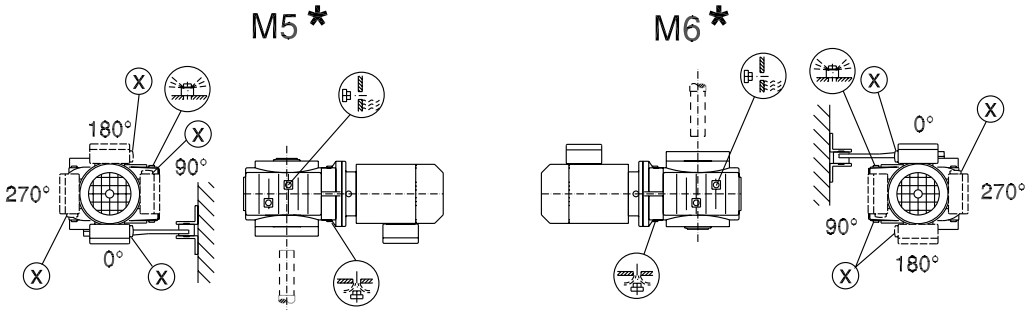
* → page 81

SA/SH/ST47...97

28 021 03 00



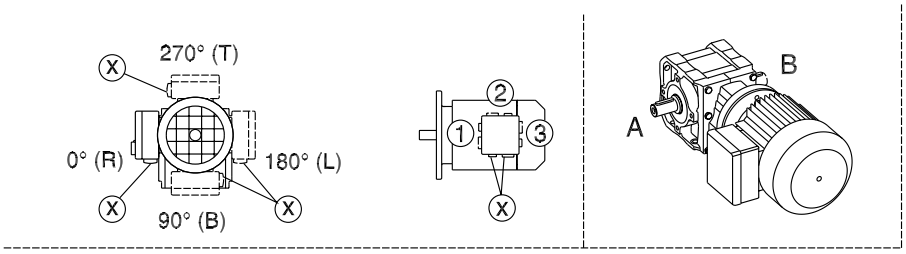


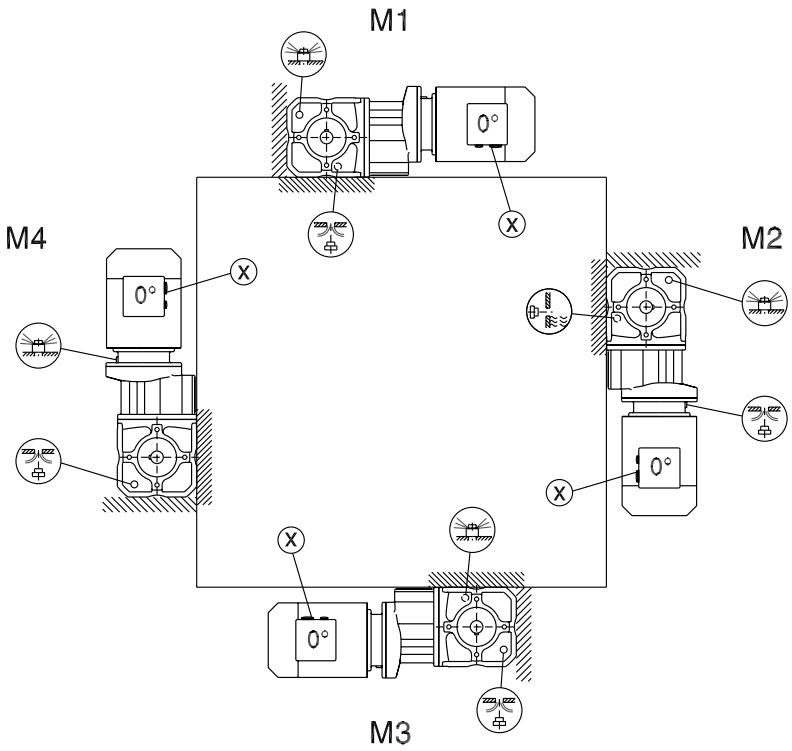


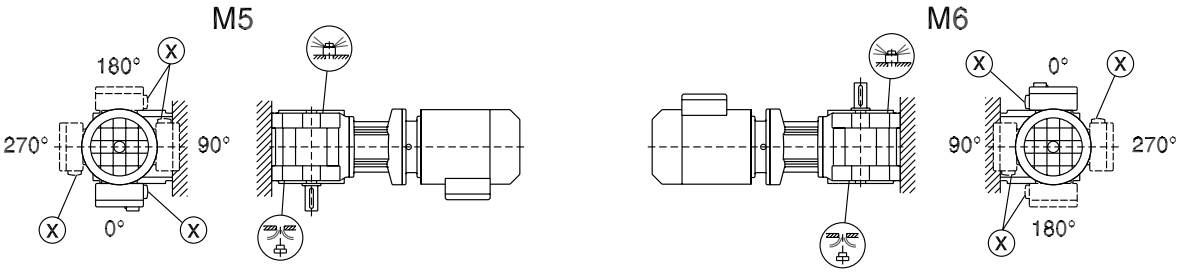
* → page 81

5.11 Mounting positions of Spiroplan® gearmotors

W/WA37B/WH37B







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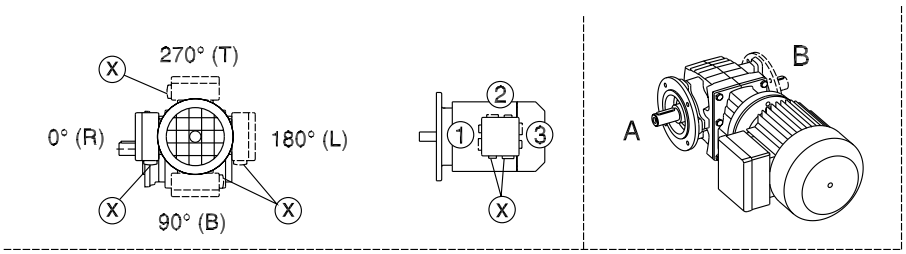
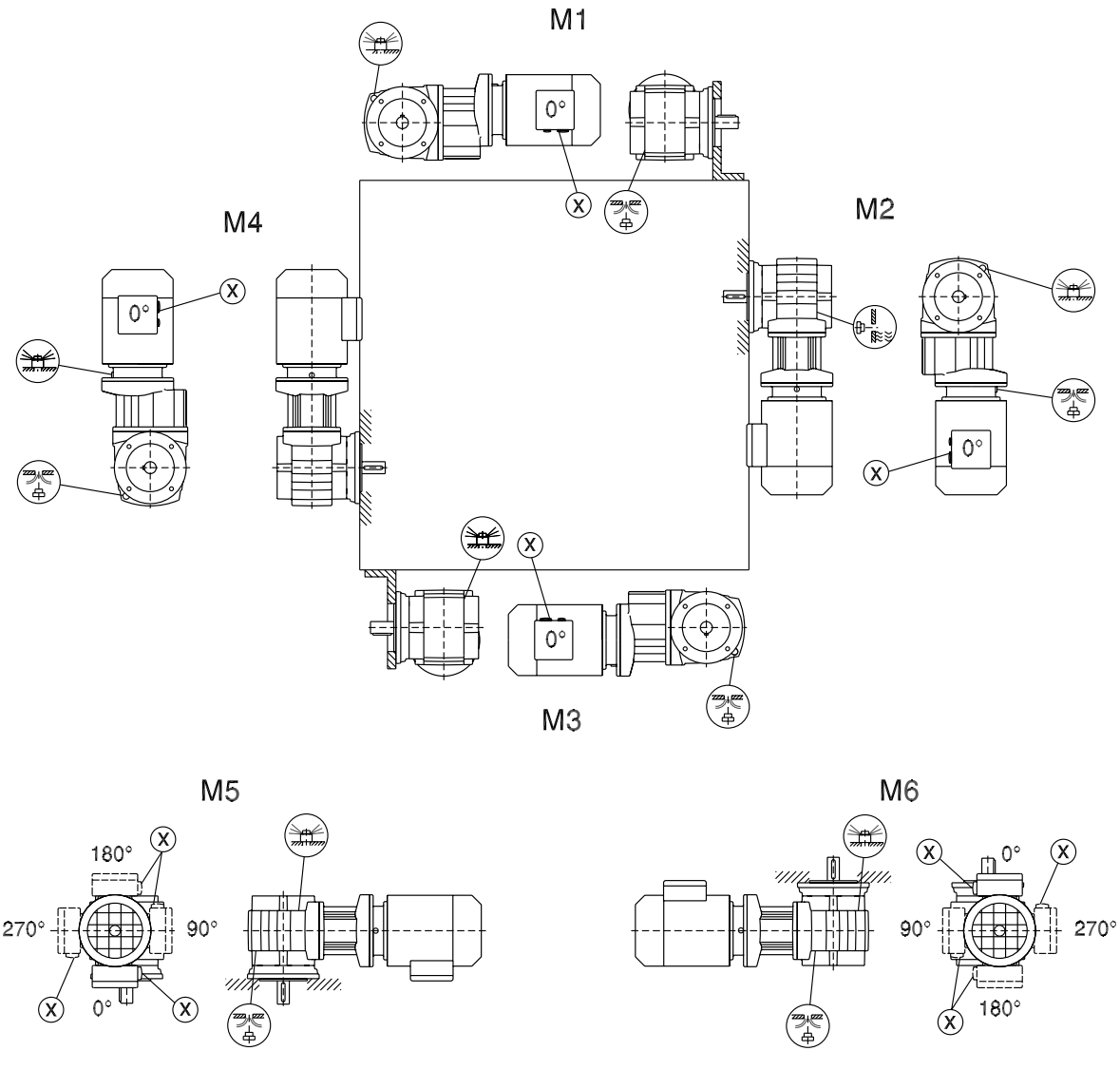
WF/WAF/WHF37





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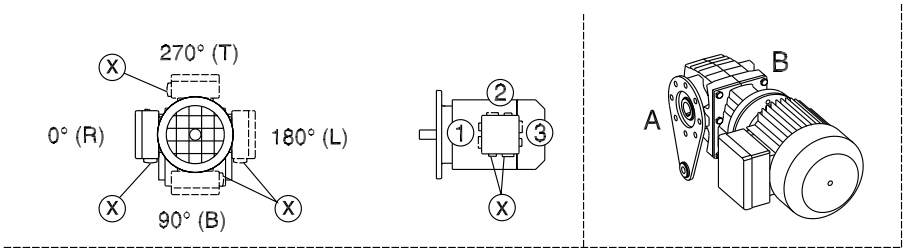
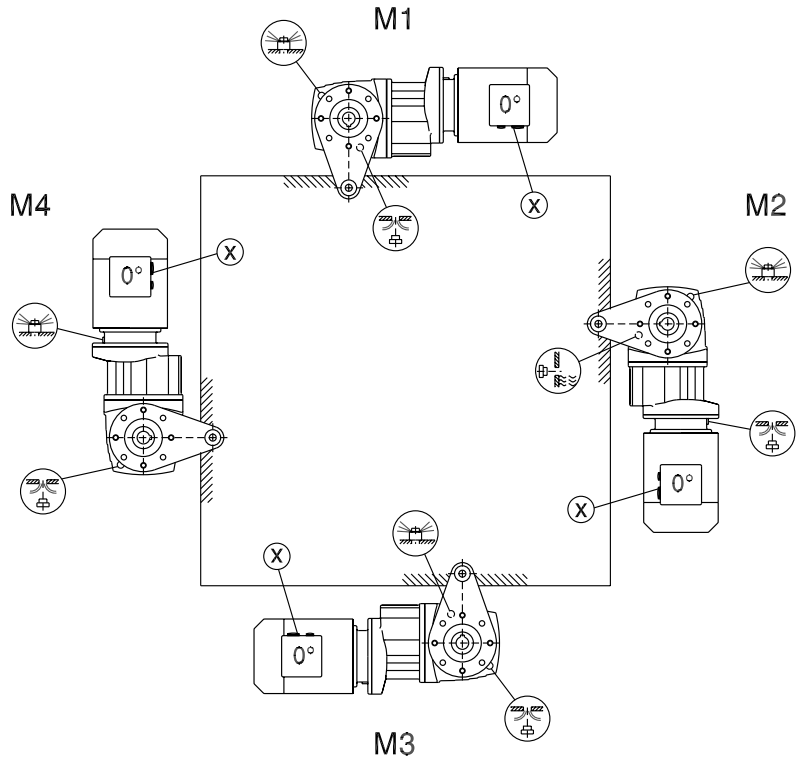
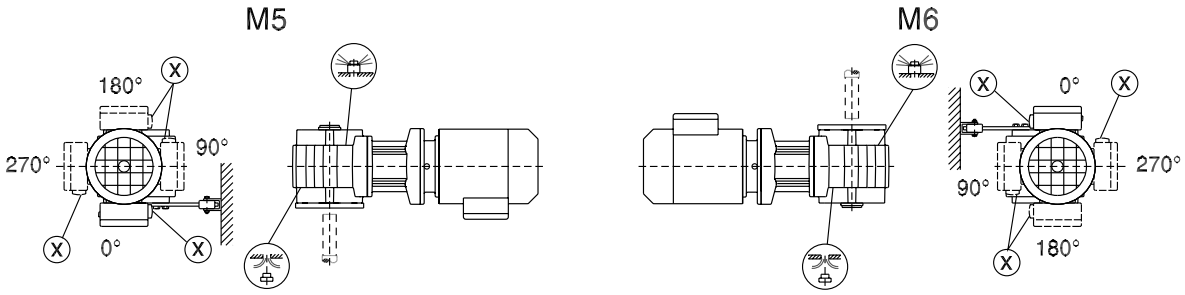
WA/WH/WT37

20 014 00 07







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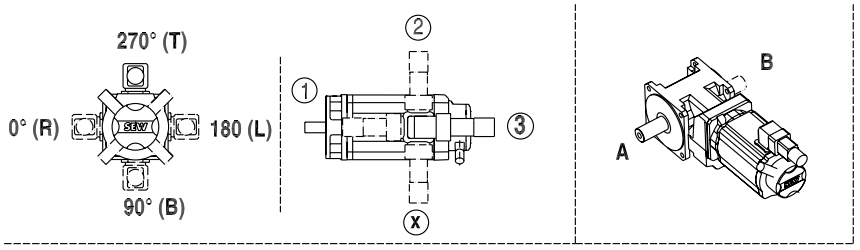
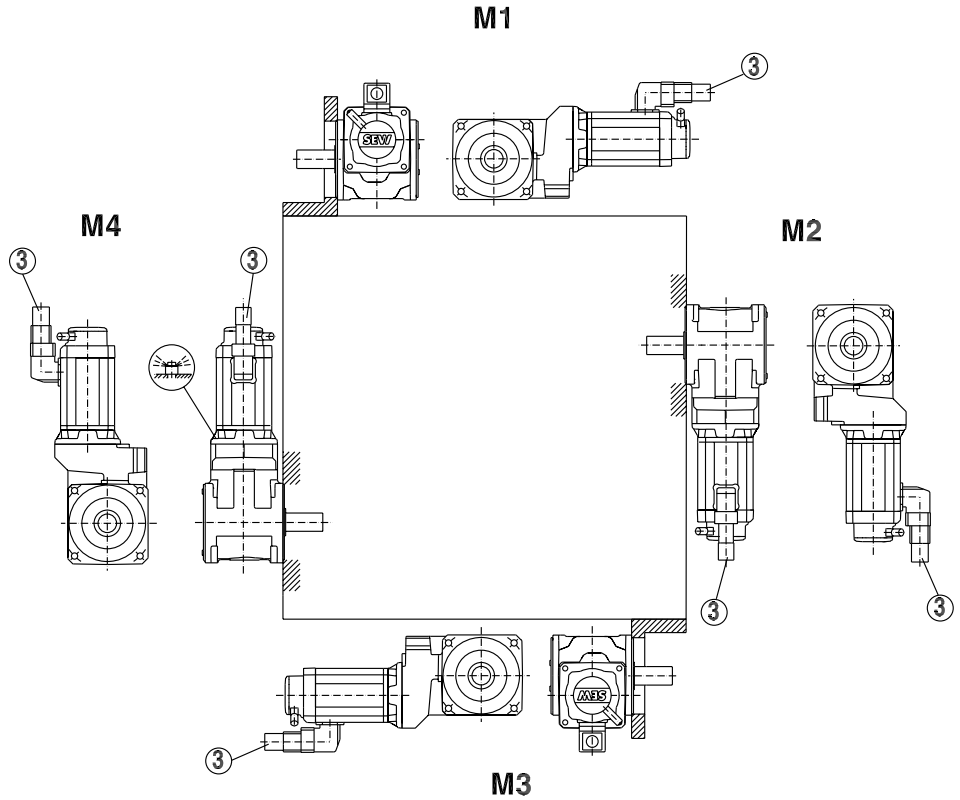
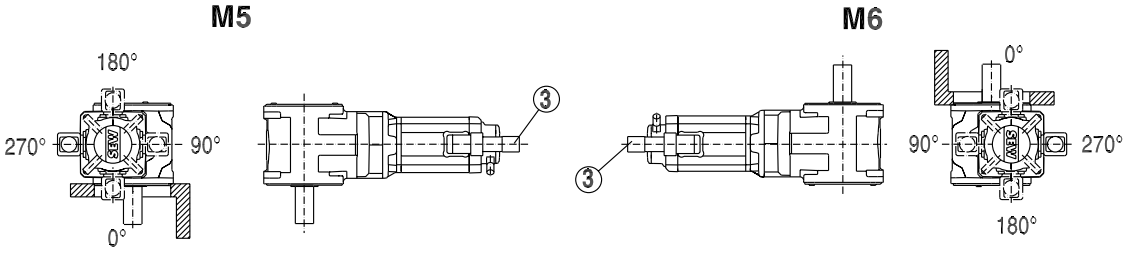
5.12 Mounting positions of BS.F helical-bevel gearmotors

BS.F202...802



56 037 00 03





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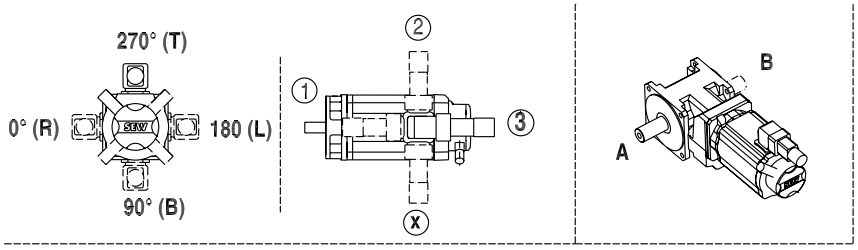
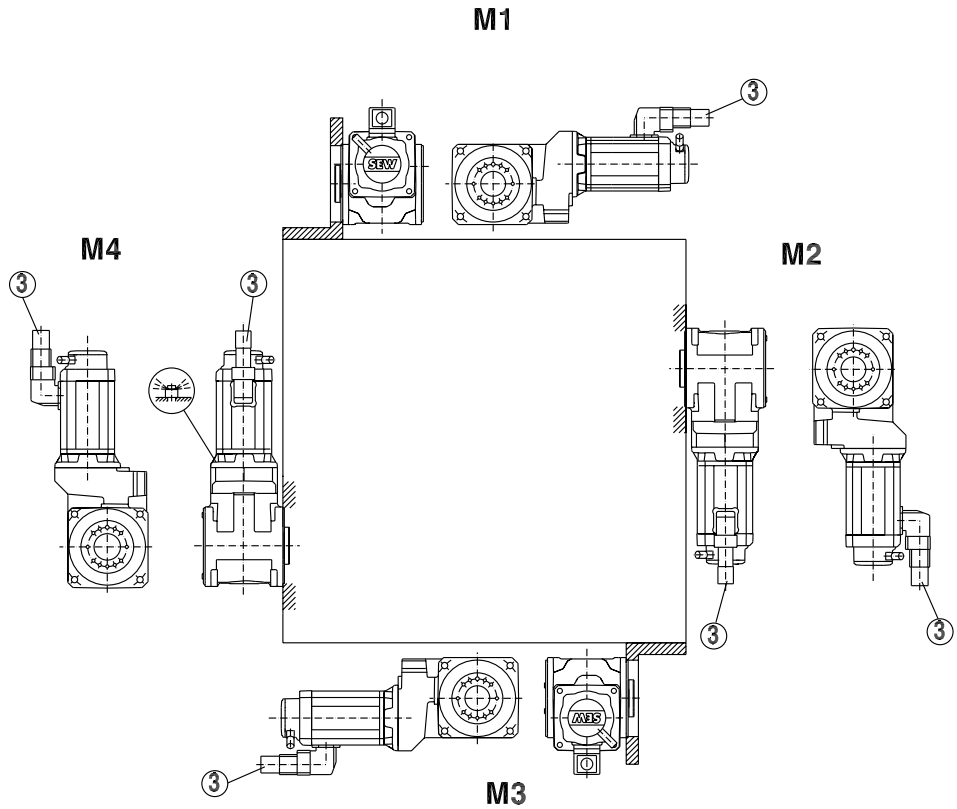
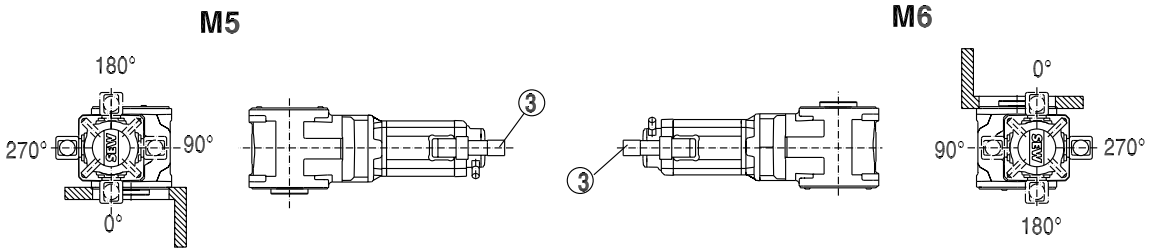
BSBF202...802



56 038 00 03





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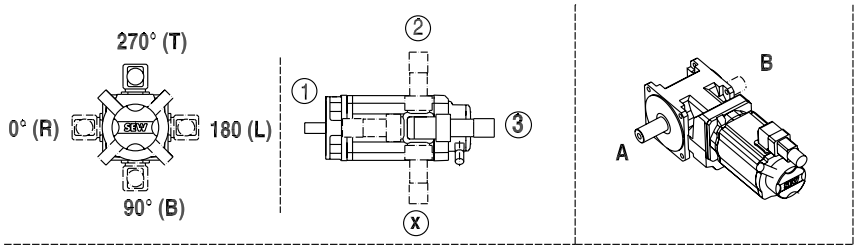
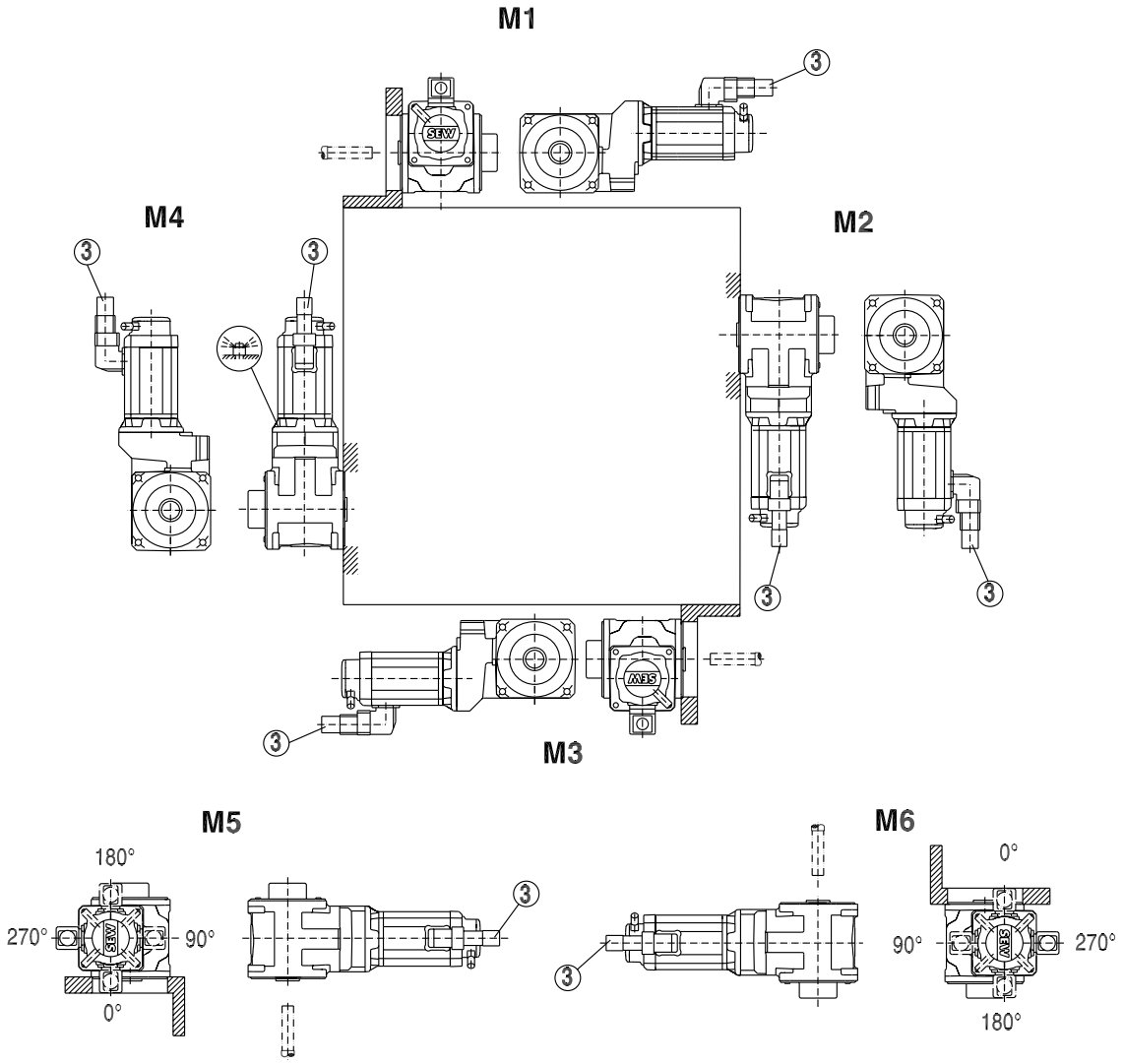
BSHF202...802

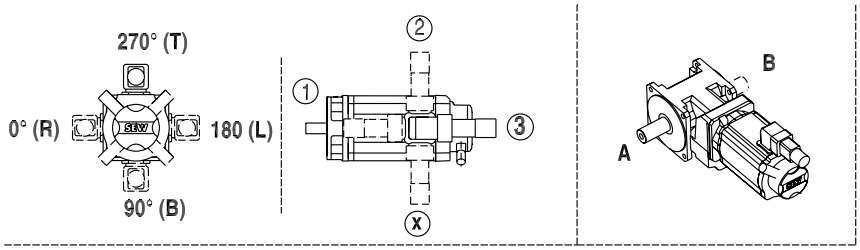


56 056 00 03

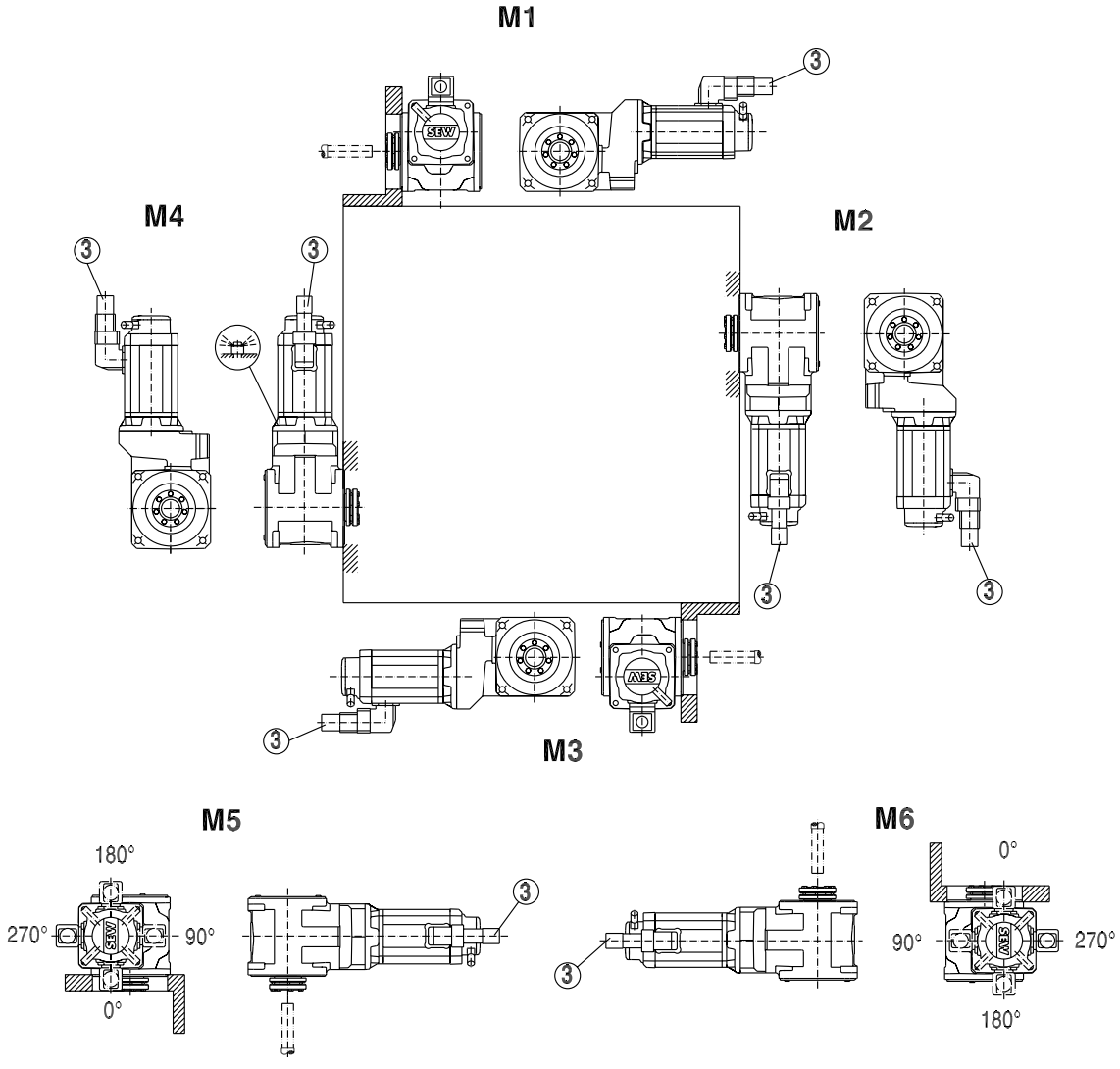


3 → page 80

BSHF202...802 /I



56 039 00 03



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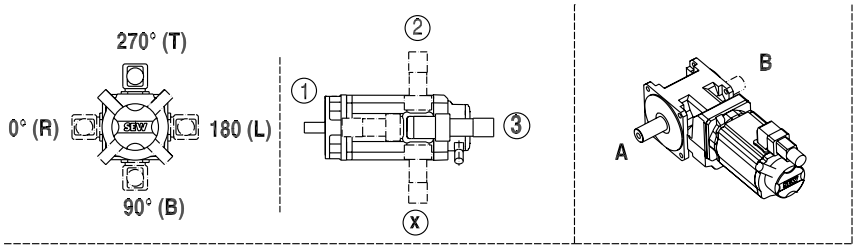
BSHF202...802 /T



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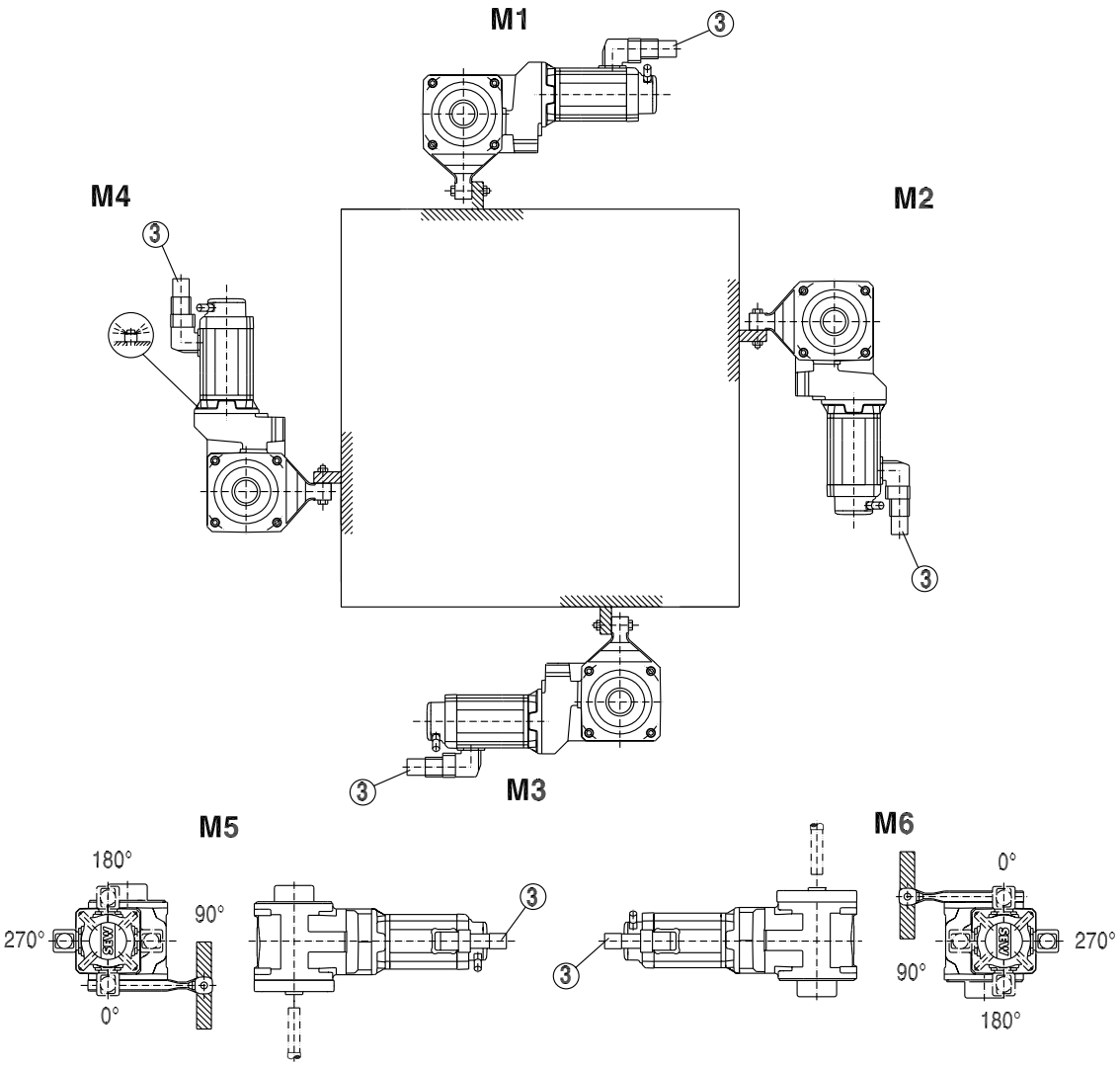

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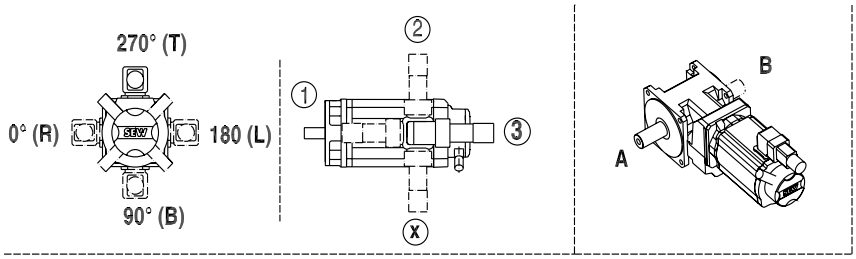
BS.F202...802B



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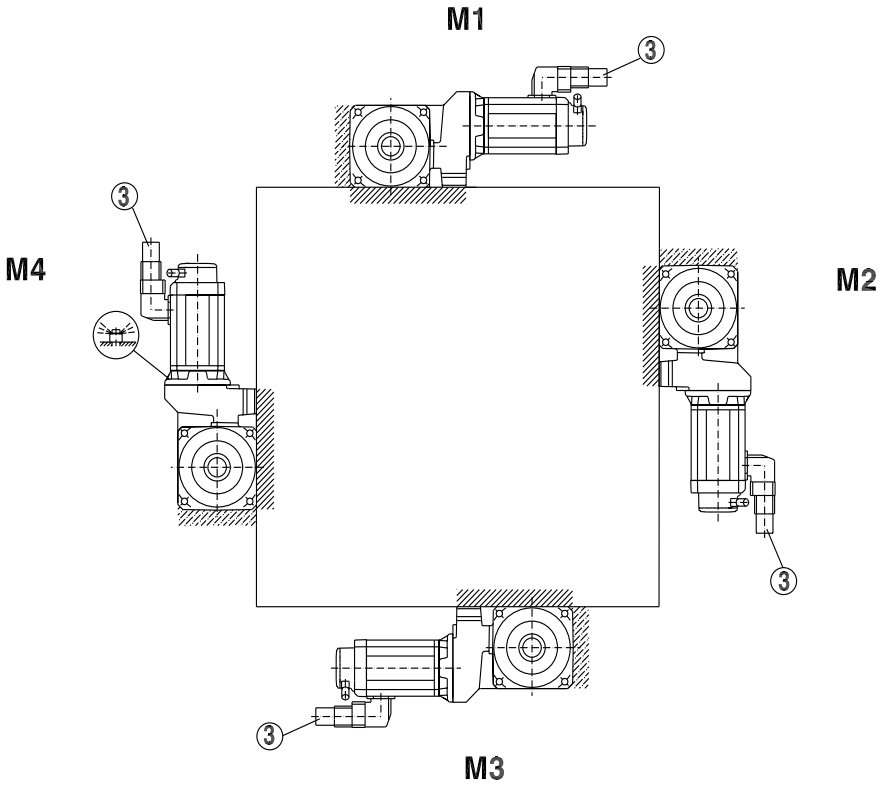

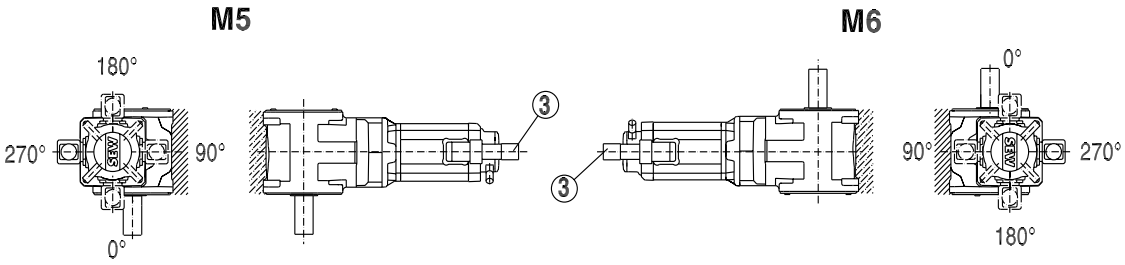

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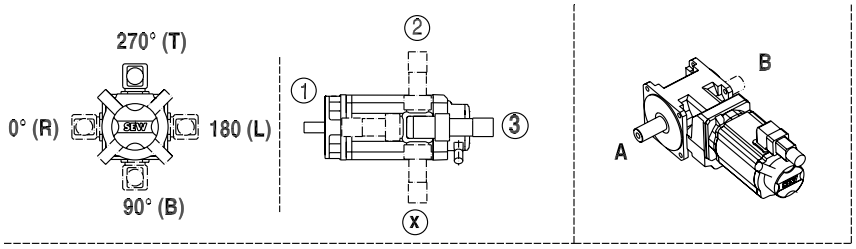

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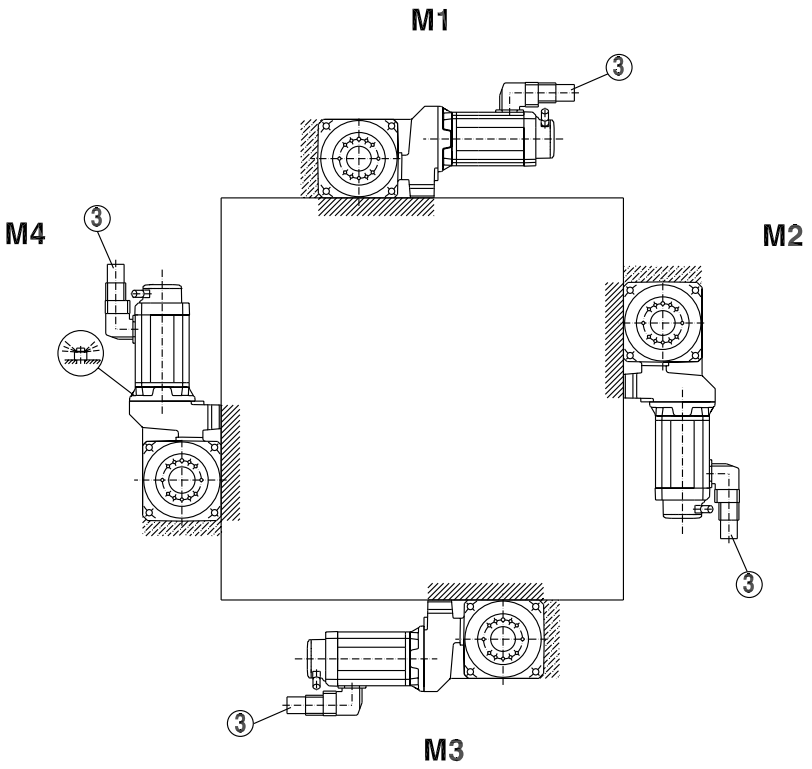

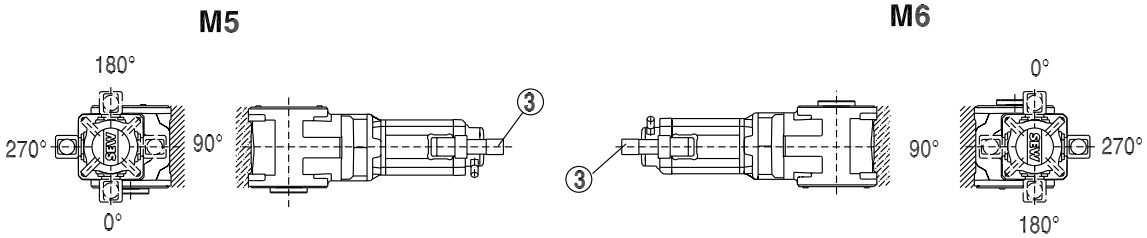

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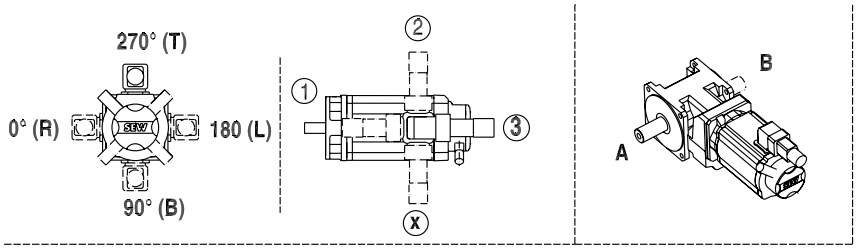
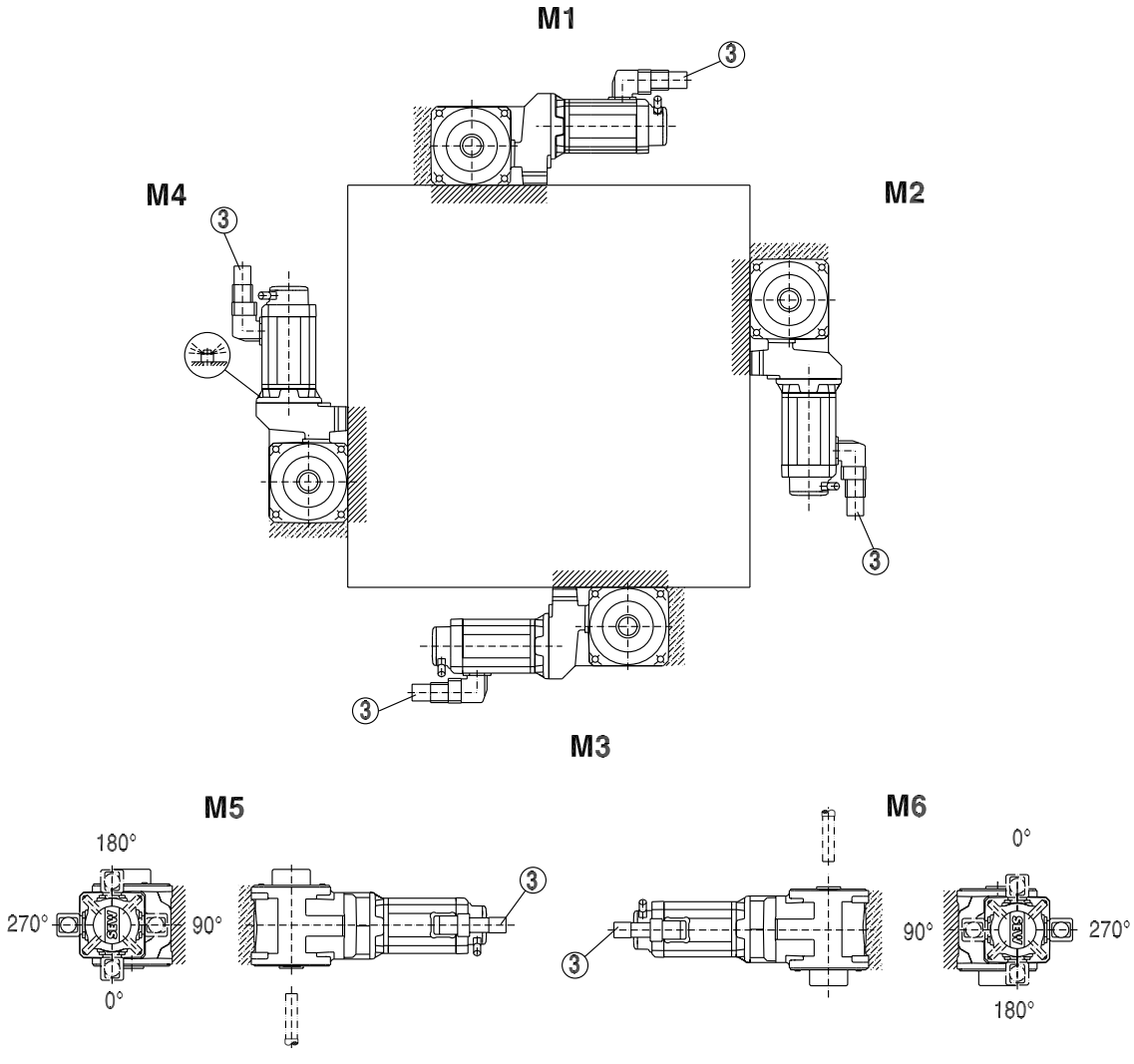


56 057 00 03



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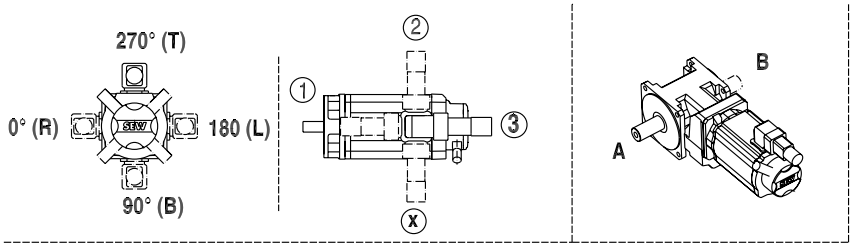
BSHF202...802B /I



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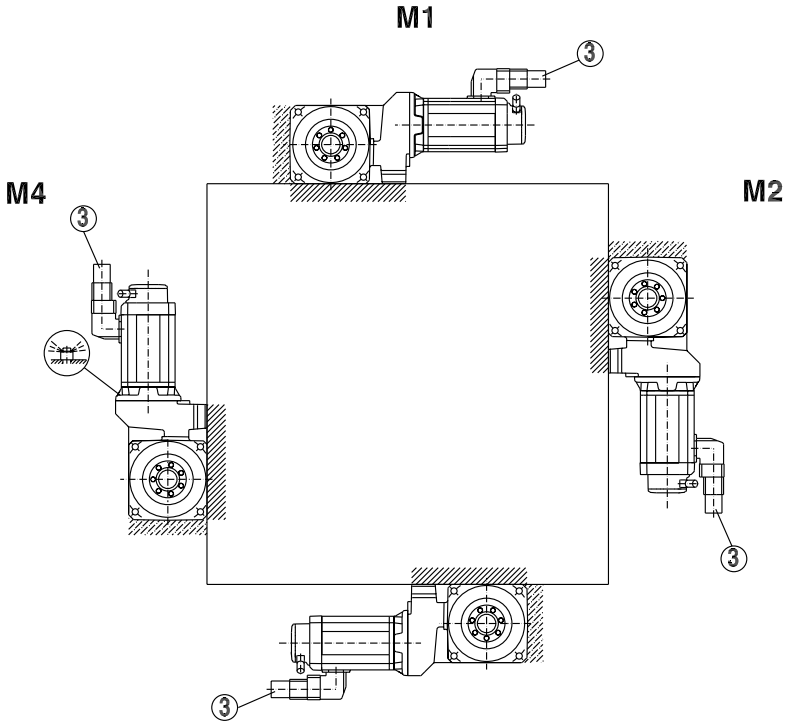

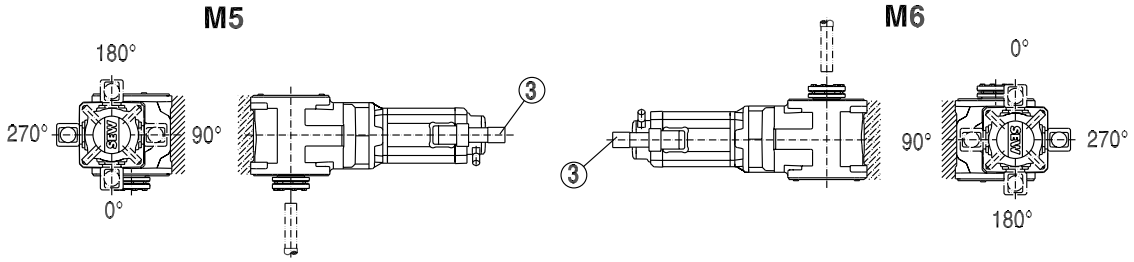

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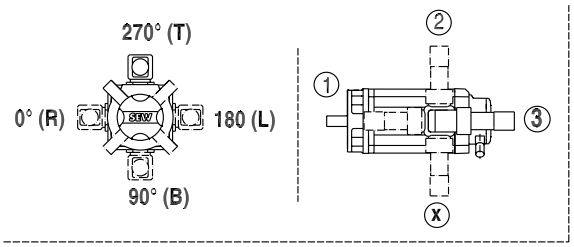
5.13 Mounting positions of PS.F, PS.C planetary gearmotors

PS.F121...922,
PS.C221...622



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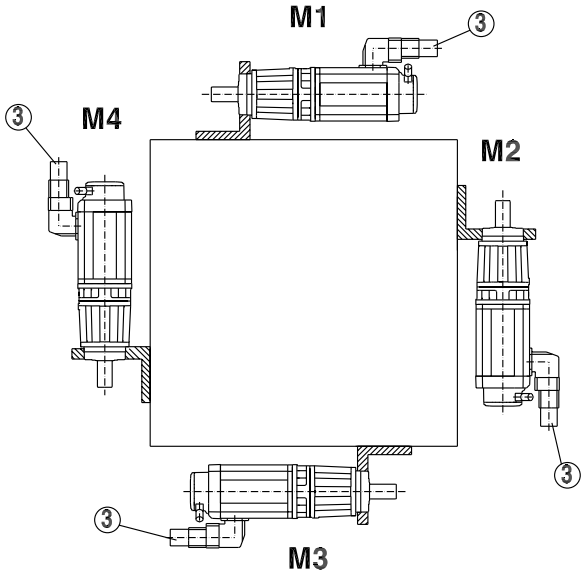

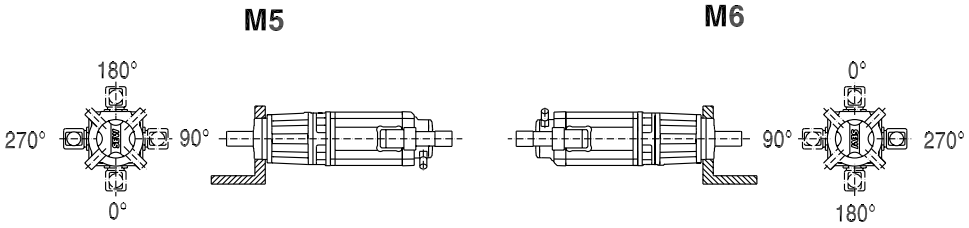

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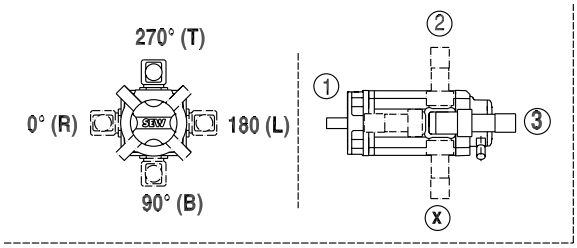
PSBF121-922



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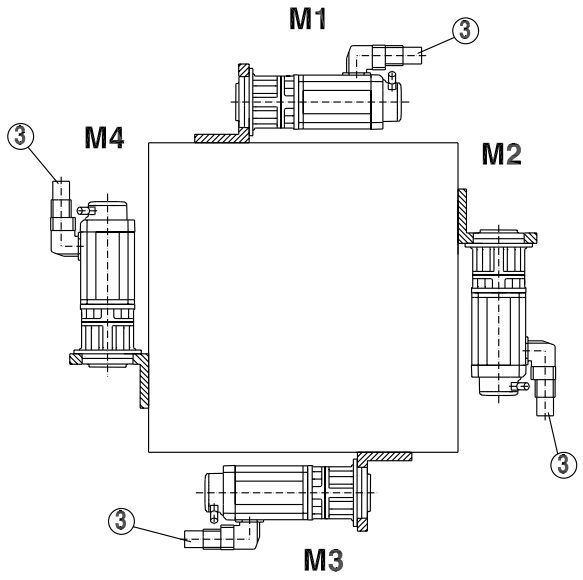

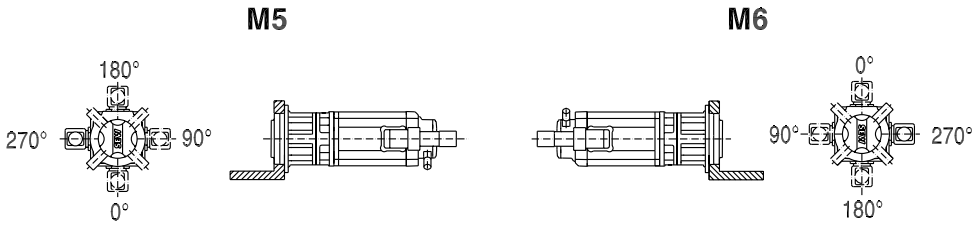

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6 Design and Operating Notes

6.1 Installation / removal of gear units with hollow shafts and keys

	NOTE
	• Always use the supplied NOCO® fluid for installation. The fluid prevents contact corrosion and facilitates subsequent disassembly. • The key dimension X is specified by the customers, but X > DK must apply, see Figure 25.

Assembly

SEW-EURODRIVE recommends two variants for installation of gear units with hollow shaft and key onto the input shaft of the driven machine (= customer shaft):

1. Use the provided fastening parts for installation.
2. Use the optional installation / removal kit for installation.

1) Supplied fastening parts

The following fastening parts are provided as standard:

- Retaining screw with washer (2)
- Circlip (3)

Note the following points concerning the customer shaft:

- The installation length of the customer shaft with contact shoulder (A) must be L8 - 1 mm.
- The installation length of the customer shaft without contact shoulder (B) must equal L8.

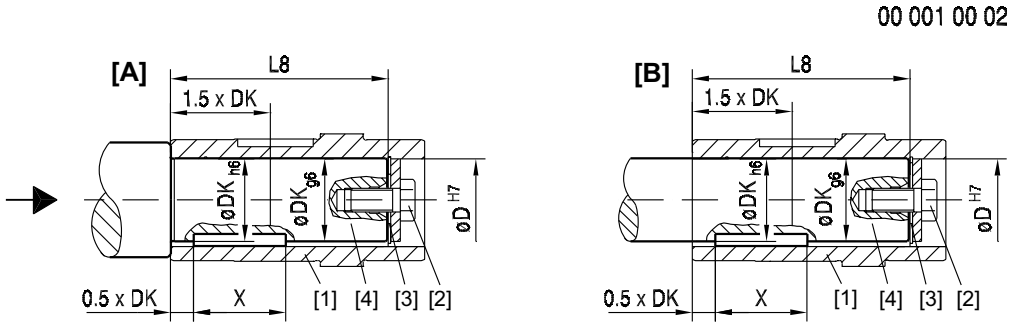

Figure 25: Customer shaft with contact shoulder (A) and without contact shoulder (B)

[1]	Hollow shaft	[3]	Circlip
[2]	Retaining screw with washer	[4]	Customer shaft

Dimensions and tightening torque:

The retaining screw (2) must be tightened to the tightening torque MS given in the following table.

Gear unit type	D^{H7} [mm]	DK [mm]	L8 [mm]	MS [Nm]
WA..10	16	16	69	8
WA..20	18	18	84	8
WA..20, WA..30, WA..37, SA..37, BASF202	20	20	84, 105 104	8
FA..27, SA..47, BASF302	25	25	88, 105, 118	20
FA..37, KA..37, SA..47 SA..57 BASF402	30	30	105 132 138	20
FA..47, KA..47, SA..57	35	35	132	20
FA..57, KA..57 FA..67, KA..67 SA..67 BSAF502	40	40	142 156 144 158	40
SA..67	45	45	144	40
FA..77, KA..77, SA..77	50	50	183	40
FA..87, KA..87 SA..77, SA..87 BSAF802	60	60	210 180, 220 222	80
FA..97, KA..97 SA..87, SA..97	70	70	270 220, 260	80
FA..107, KA..107, SA..97	90	90	313, 313, 255	200
FA..127, KA..127	100	100	373	200
FA..157, KA..157	120	120	460	200
BSAF602	55	55	179	80

2) Installation / removal set

You can also use the optional installation / removal kit for installation. You order the kit for the specific gear unit type(s) by quoting the part numbers in the table below. The delivery includes:

- Spacer tube for installation without contact shoulder (5)
- Retaining screw for installation (2)
- Forcing washer for removal (7)
- Locked nut for removal (8)

The short retaining screw delivered as standard is not required.

Note the following points concerning the customer shaft:

- The installation length of the customer shaft must be LK2. Do not use the spacer if the customer shaft **has a contact shoulder (A)**.
- The installation length of the customer shaft must be LK2. Use the spacer if the customer shaft **has a contact shoulder (B)**.

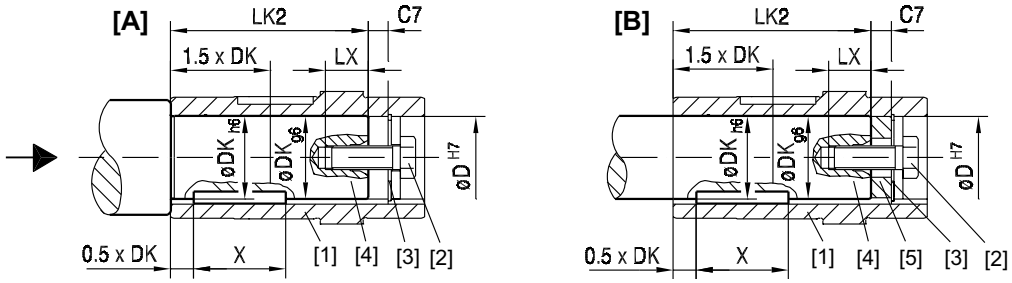

Figure 26: Customer shaft with contact shoulder (A) and without contact shoulder (B)

[1]	Hollow shaft	[4]	Customer shaft
[2]	Retaining screw with washer	[5]	Spacer tube
[3]	Circlip		

Dimensions, tightening torques and part numbers:

The retaining screw (2) must be tightened to the tightening torque MS given in the following table.

Type	D^{H7} [mm]	DK [mm]	LK2 [mm]	LX^{+2} [mm]	C7 [mm]	MS [Nm]	Part number of installation removal set
WA..10	16	16	57	12.5	11	8	643 712 5
WA..20	18	18	72	16	12	8	643,682 X
WA..20, WA..30, WA..37 SA..37	20	20	72, 93 92	16	12	8	643 683 8
FA..27, SA..47	25	25	72, 89	22	16	20	643 684 6
FA..37, KA..37 SA..47, SA..57	30	30	89 89, 116	22	16	20	643 685 4
FA..47, KA..47, SA..57	35	35	114	28	18	20	643 686 2
FA..57, KA..57 FA..67, KA..67, SA..67	40	40	124 138, 138, 126	36	18	40	643 687 0
SA..67	45	45	126	36	18	40	643 688 9
FA..77, KA..77, SA..77	50	50	165	36	18	40	643 689 7
FA..87, KA..87 SA..77, SA..87	60	60	188 158, 198	42	22	80	643 690 0
FA..97, KA..97 SA..87, SA..97	70	70	248 198, 238	42	22	80	643 691 9
FA..107, KA..107 SA..97	90	90	287 229	50	26	200	643 692 7
FA..127, KA..127	100	100	347	50	26	200	643 693 5
FA..157, KA..157	120	120	434	50	26	200	643 694 3

Removal

Applies only if installation / removal kit was previously used for installation (see Figure 26).

Proceed as follows for removal:

1. Loosen the retaining screw (6).
2. Remove the circlip (3) and, if used, the spacer tube (5).
3. According to Figure 27 place the forcing washer (7) and the locked nut (8) between the customer shaft (4) and circlip (3).
4. Re-install the circlip (3).
5. Re-install the retaining screw (6). Now you can force the gear unit off the shaft.

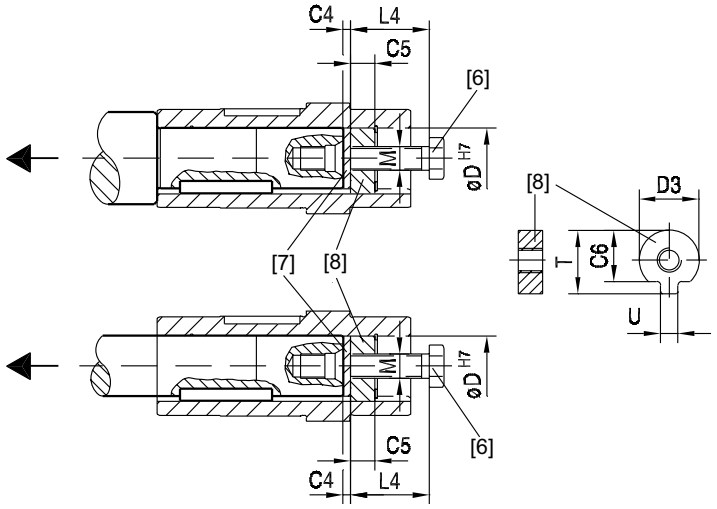

Figure 27: Removal

[6]	Retaining screw	[8]	Locked nut for removal
[7]	Forcing washer		

Dimensions and part numbers:

Type	D^{H7} [mm]	M	C4 [mm]	C5 [mm]	C6 [mm]	$U^{-0.5}$ [mm]	$T^{-0.5}$ [mm]	$D3^{-0.5}$ [mm]	L4 [mm]	Part number of installation/ removal kit
WA..10	16	M5	5	5	12	4.5	18	15.7	50	643 712 5
WA..20	18	M6	5	6	13.5	5.5	20.5	17.7	25	643,682 X
WA..20, WA..30, WA..37, SA..37	20	M6	5	6	15.5	5.5	22.5	19.7	25	643 683 8
FA27.., SA..47	25	M10	5	10	20	7.5	28	24.7	35	643 684 6
FA..37, KA..37, SA..47, SA..57	30	M10	5	10	25	7.5	33	29.7	35	643 685 4
FA..47, KA..47, SA..57	35	M12	5	12	29	9.5	38	34.7	45	643 686 2
FA..57, KA..57, FA..67, KA..67, SA..67	40	M16	5	12	34	11.5	41.9	39.7	50	643 687 0
SA..67	45	M16	5	12	38.5	13.5	48.5	44.7	50	643 688 9
FA..77, KA..77, SA..77	50	M16	5	12	43.5	13.5	53.5	49.7	50	643 689 7
FA..87, KA..87, SA..77, SA..87	60	M20	5	16	56	17.5	64	59.7	60	643 690 0
FA..97, KA..97, SA..87, SA..97	70	M20	5	16	65.5	19.5	74.5	69.7	60	643 691 9
FA..107, KA..107, SA..97	90	M24	5	20	80	24.5	95	89.7	70	643 692 7
FA..127, KA..127	100	M24	5	20	89	27.5	106	99.7	70	643 693 5
FA..157, KA..157	120	M24	5	20	107	31	127	119.7	70	643 694 3

6.2 Gear units with hollow shaft

Chamfers on hollow shafts

The following illustration shows the chamfers on parallel shaft helical, helical-bevel, helical-worm and Spiroplan® gear units with hollow shaft:

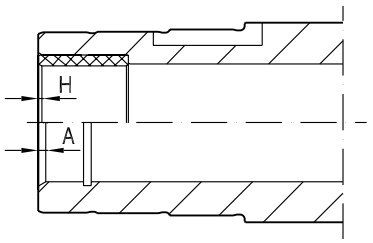

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Figure 28: Chamfers on hollow shafts

Gear units	Design	
	with hollow shaft (A)	with hollow shaft and shrink disc (H)
W..10 - W..30	2 × 30°	-
F..27	2 × 30°	0.5 × 45°
F../K../S../W..37	2 × 30°	0.5 × 45°
F../K../S..47	2 × 30°	0.5 × 45°
S..57	2 × 30°	0.5 × 45°
F../K..57	2 × 30°	3 × 2°
F../K../S..67	2 × 30°	3 × 2°
F../K../S..77	2 × 30°	3 × 2°
F../K../S..87	3 × 30°	3 × 2°
F../K../S..97	3 × 30°	3 × 2°
F../K..107	3 × 30°	3 × 2°
F../K..127	5 × 30°	1.5 × 30°
F../K..157	5 × 30°	1.5 × 30°
KH167	-	1.5 × 30°
KH187	-	1.5 × 30°
BS.F202...402	2 × 30°	0.5 × 45°
BS.F502...802	2 × 30°	3 × 2°

Special motor/gear unit combinations

Please note for parallel shaft helical gearmotors with hollow shaft (FA..B, FV..B, FH..B, FAF, FVF, FHF, FA, FV, FH, FT, FAZ, FVZ, FHZ):

- If you are using a customer shaft pushed through on the motor end, there may be a collision when a "small gear unit" is used in combination with a "large motor".
- Check the motor dimension AC to decide whether there will be a collision with a pushed-through customer shaft.

6.3 TorqLOC® mounting system for gear units with hollow shaft

Description of TorqLOC®

The TorqLOC® hollow shaft mounting system is used for achieving a non-positive connection between customer shaft and the hollow shaft in the gear unit. As a result, the TorqLOC® hollow shaft mounting system is an alternative to the hollow shaft with shrink disc, the hollow shaft with key and the splined hollow shaft that have been used so far.

The TorqLOC® hollow shaft mounting system consists of the following components:

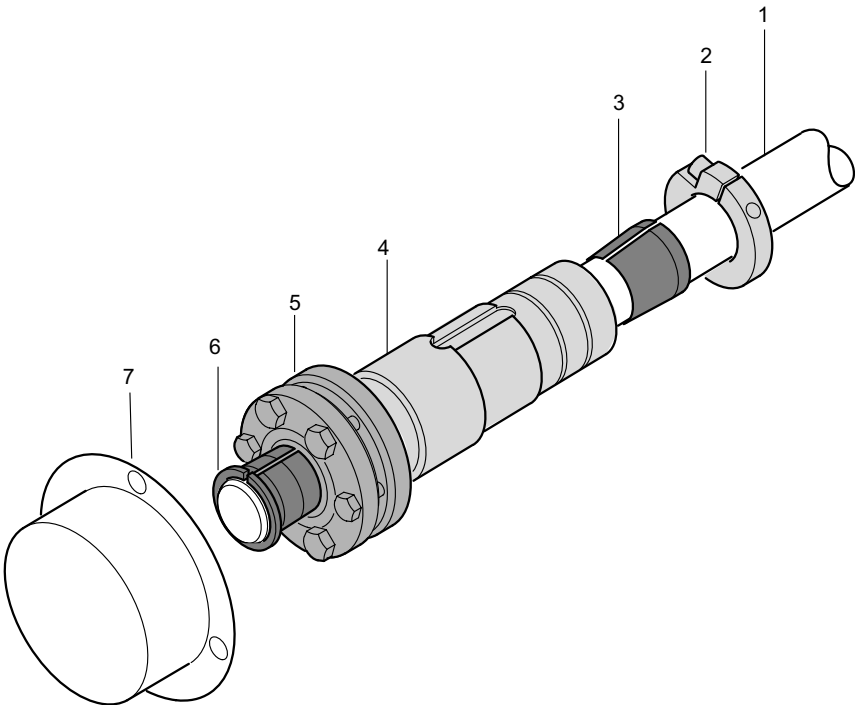

Figure 29: Components of the TorqLOC® hollow shaft mounting system

[1]	Customer shaft	[5]	Shrink disc
[2]	Locking collar	[6]	Conical steel bushing
[3]	Conical bronze bushing	[7]	Fixed cover
[4]	Hollow shaft in gear unit		

Advantages of TorqLOC®

The TorqLOC® hollow shaft mounting system is characterized by the following advantages:

- Cost saving because the customer shaft can be made from drawn material up to quality h11.
- Cost saving because different customer shaft diameters can be covered by one hollow shaft diameter and different bushings.
- Simple installation since there is no need to accommodate any shaft connections.
- Simple removal even after many hours of operation because the formation of contact corrosion has been reduced and the conical connections can easily be released.

Technical data

The TorqLOC® hollow shaft mounting system is approved for input torques of 92 Nm to 18 000 Nm.

The following gear units are available with TorqLOC® hollow shaft mounting system:

- Parallel shaft helical gear units in gear unit sizes 37 to 157 (FT37 ... FT157)
- Helical-bevel gear units in gear unit sizes 37 to 157 (KT37 ... KT157)
- Helical-worm gear units in gear unit sizes 37 to 97 (ST37 ... ST97)
- Spiroplan® gear unit of size 37 (WT37)

Available options

The following options are available for gear units with TorqLOC® hollow shaft mounting system:

- Helical-bevel, helical-worm and Spiroplan® gear units with TorqLOC® (KT.., ST.., WT37): The "torque arm" (../T) option is available.
- Parallel shaft helical gear units with TorqLOC® (FT..): The "rubber buffer" (../G) option is available.

6.4 Gear unit with flange block shaft

	NOTE
	Only use screws in **strength class 12.9** to fasten the output elements onto the flange block shaft of the gear unit.

6.5 Shouldered hollow shaft with shrink disc option

As an option, gear units with hollow shaft and shrink disc (parallel shaft helical gear units FH/FHF/FHZ37-157, helical-bevel gear units KH/KHF/KHZ37-157 and helical-worm gear units SH/SHF47-97) can be supplied with a larger bore diameter D'.

As standard, D' = D.

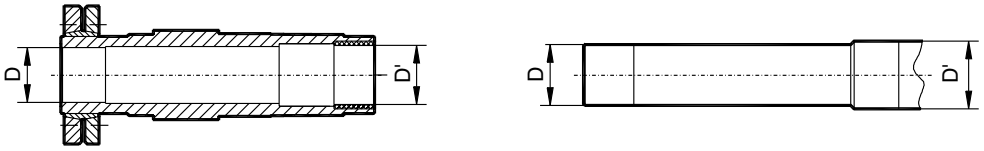

Figure 30: Optional bore diameter D'

Gear units	Bore diameter D / optionally D' [mm]
FH/FHF/FHZ37, KH/KHF/KHZ37, SH/SHF/SHZ47	30 / 32
FH/FHF/FHZ47, KH/KHF/KHZ47, SH/SHF/SHZ57	35 / 36
FH/FHF/FHZ57, KH/KHF/KHZ57	40 / 42
FH/FHF/FHZ67, KH/KHF/KHZ67, SH/SHF/SHZ67	40 / 42
FH/FHF/FHZ77, KH/KHF/KHZ77, SH/SHF/SHZ77	50 / 52
FH/FHF/FHZ87, KH/KHF/KHZ87, SH/SHF/SHZ87	65 / 66
FH/FHF/FHZ97, KH/KHF/KHZ97, SH/SHF/SHZ97	75 / 76
FH/FHF/FHZ107, KH/KHF/KHZ107	95 / 96
FH/FHF/FHZ127, KH/KHF/KHZ127	105 / 106
FH/FHF/FHZ157, KH/KHF/KHZ157	125 / 126

Diameter D / D' must be specified when ordering gear units with a shouldered hollow shaft (optional bore diameter D').

Order example FH37 DRS80M4 with hollow shaft 30 / 32 mm

Parallel shaft helical gear units with shouldered hollow shaft (dimensions in mm):

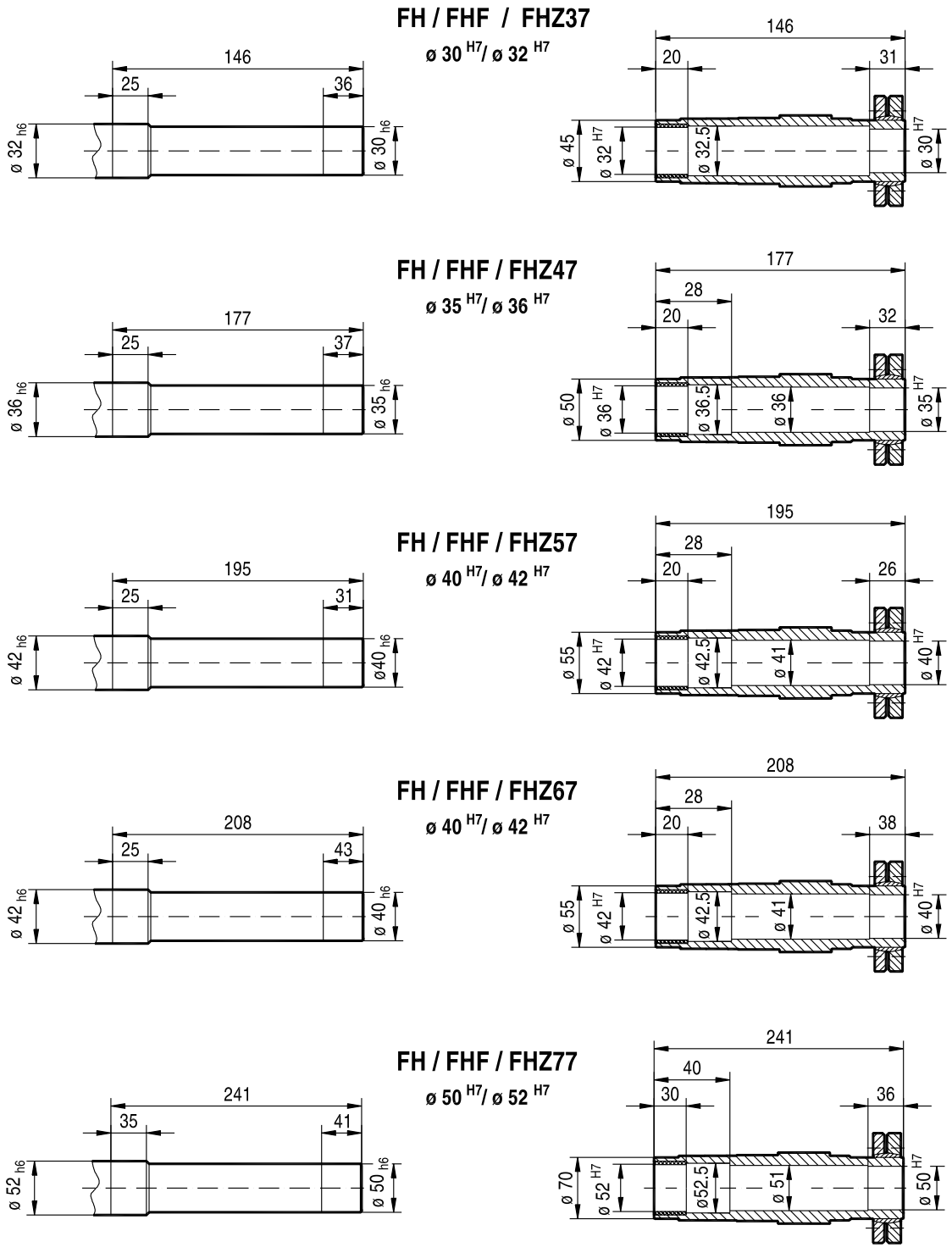

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Figure 31: Shouldered hollow shaft FH/FHF/FHZ37...77

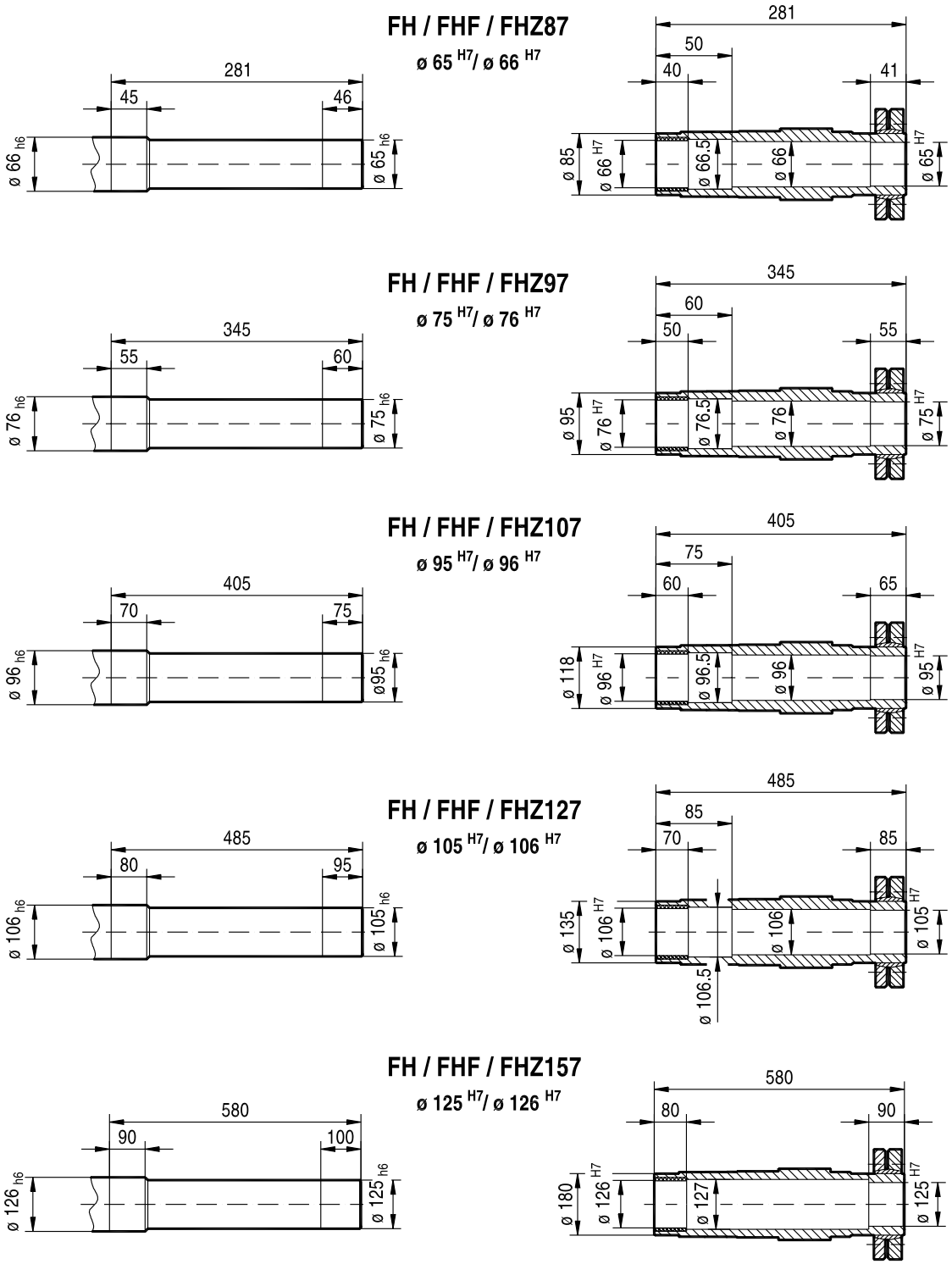

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Figure 32: Shouldered hollow shaft FH/FHF/FHZ87...157

Helical-bevel gear unit with shouldered hollow shaft (dimensions in mm):

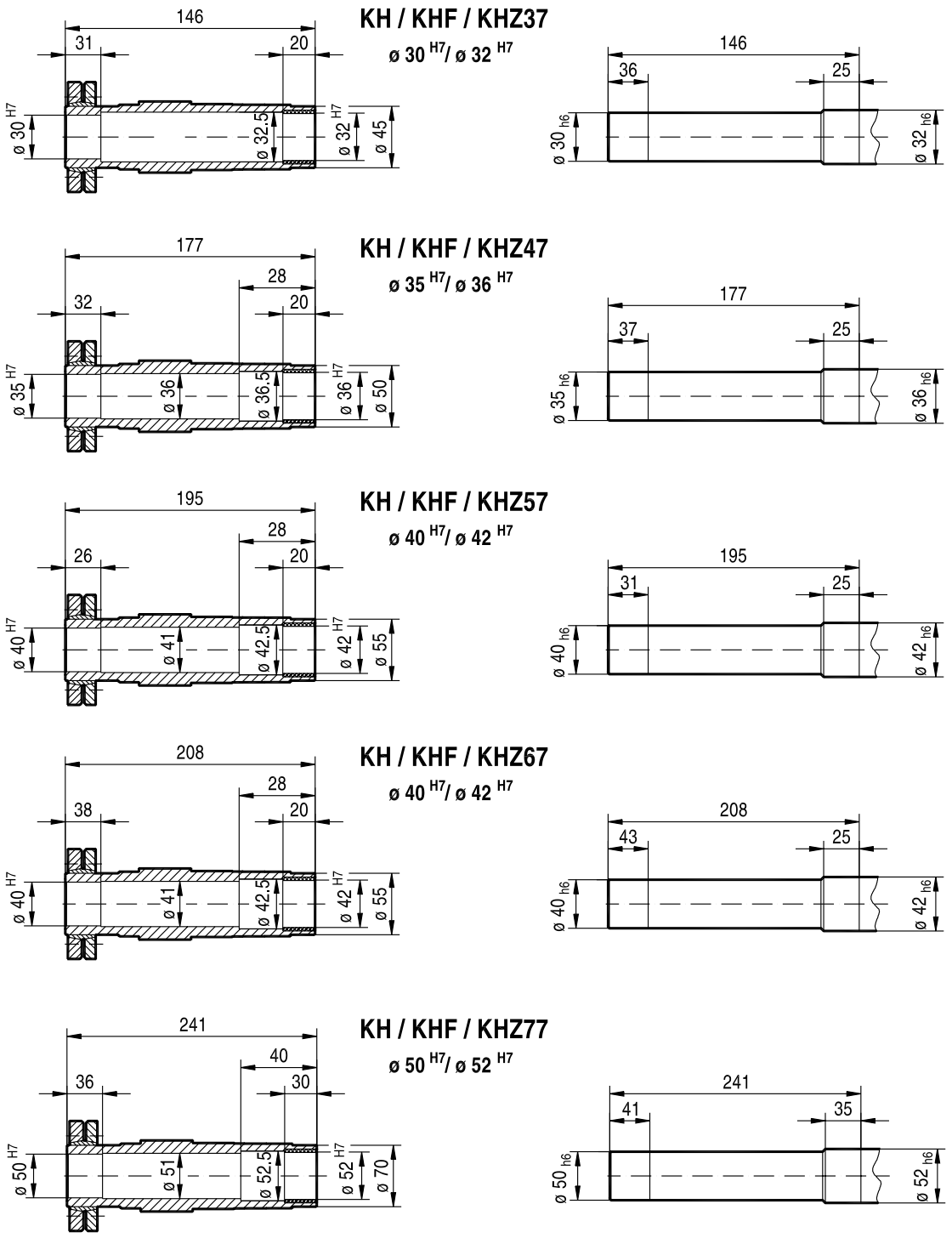

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Figure 33: Shouldered hollow shaft KH/KHF/KHZ37...77

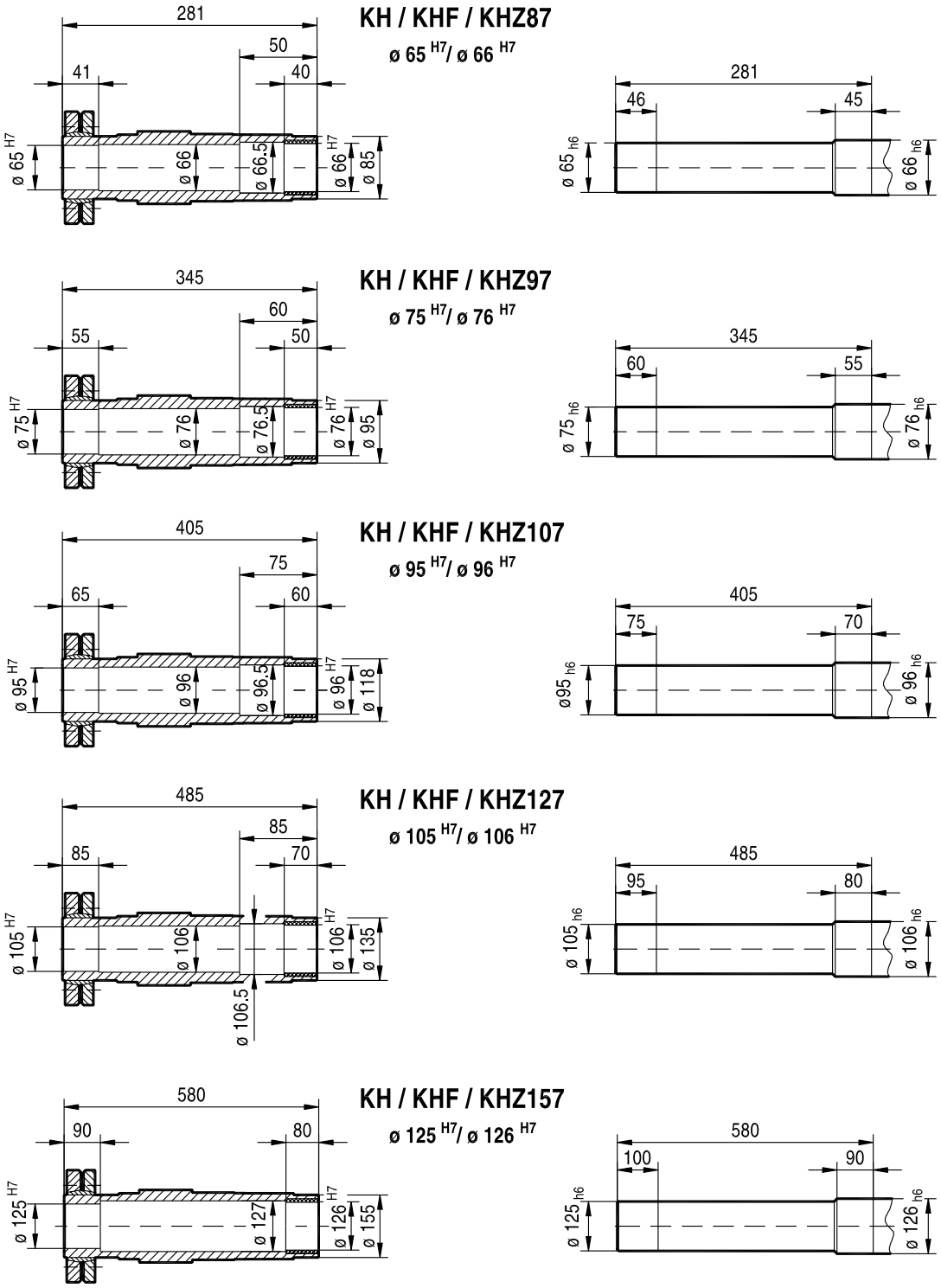

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Figure 34: Shouldered hollow shaft KH/KHF/KHZ87...157

Helical-worm gear units with shouldered hollow shaft (dimensions in mm):

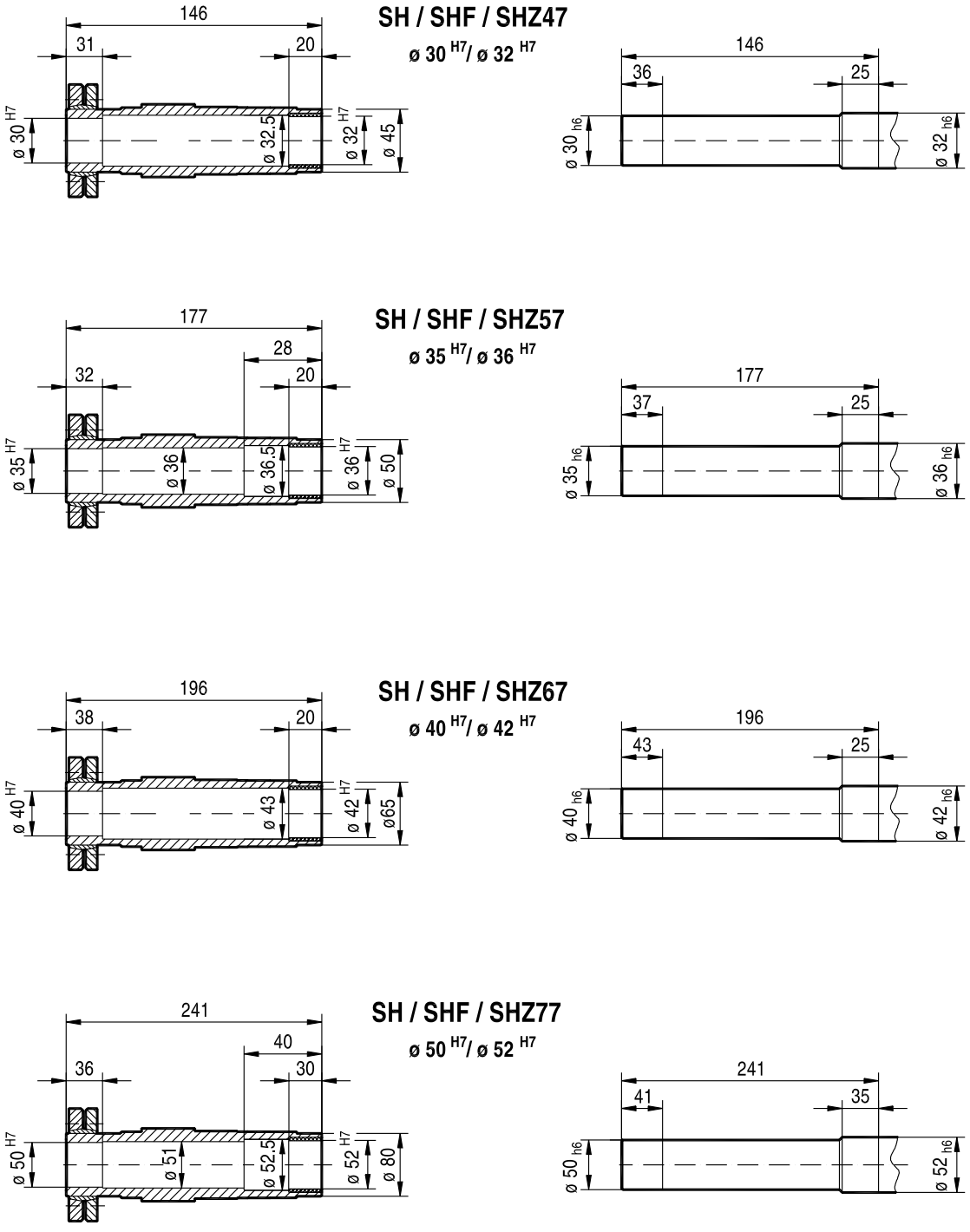

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Figure 35: Shouldered hollow shaft SH/SHF/SHZ47...77

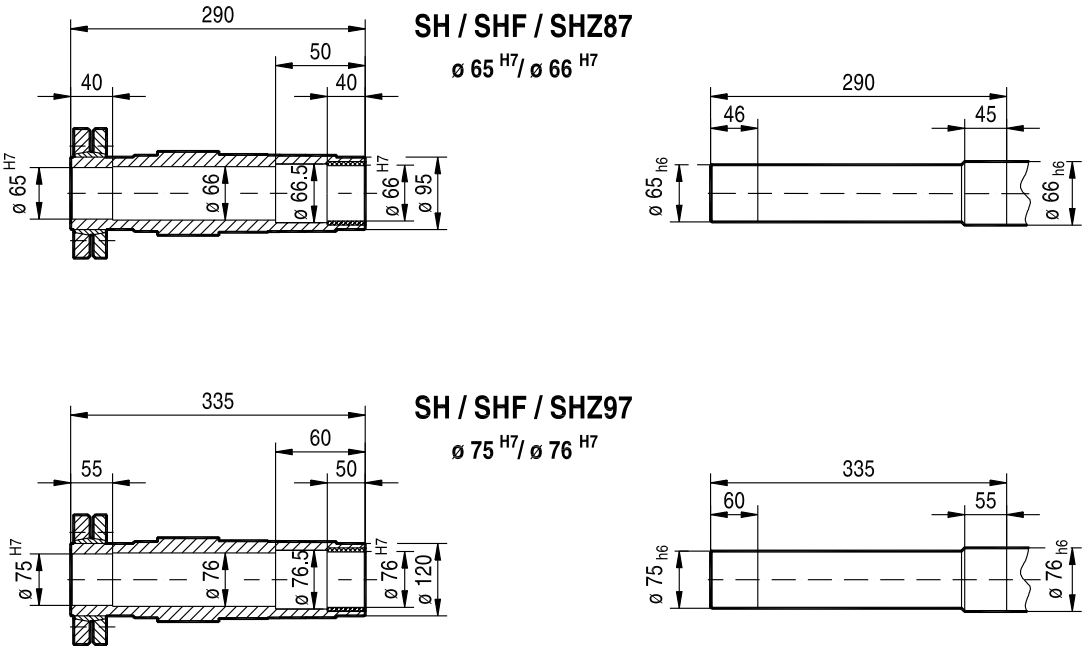

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Figure 36: Shouldered hollow shaft SH/SHF/SHZ87...97

6.6 Fastening the gear unit

Use bolts of quality 8.8 to fasten gear units and gearmotors.

Exception

Use bolts of **quality 10.9** to fasten the customer flange to transmit the rated torques for the following flange-mounted gearmotors (RF ../RZ..) and foot/flange-mounted versions (R..F, BS.F..B):

- RF37, R37F with flange ∅ 120 mm
- RF47, R47F with flange ∅ 140 mm
- RF57, R57F with flange ∅ 160 mm
- RZ37 ... RZ87
- BS.F502B ... BS.F802B

6.7 Torque arms

Available torque arms

Gear units	Size					
	27	37	47	57	67	77
KA, KH, KV, KT	-	643 425 8	643 428 2	643 431 2	643 431 2	643 434 7
SA, SH, ST	-	126 994 1	644 237 4	644 240 4	644 243 9	644 246 3
FA, FH, FV, FT Rubber buffer (2 pieces)	013 348 5	013 348 5	013 348 5	013 348 5	013 348 5	013 349 3

Gear units	Size				
	87	97	107	127	157
KA, KH, KV, KT	643 437 1	643 440 1	643 443 6	643 294 8	-
SA, SH, ST	644 249 8	644 252 8	-	-	-
FA, FH, FV, FT Rubber buffer (2 pieces)	013 349 3	013 350 7	013 350 7	013 351 5	013 347 7

Gear unit	Size				
	10	20	30	37	
WA	1 061 021 9	1 68 073 0	1 68 011 0	1 061 129 0	

Gear units	Size					
	202	302	402	502	602	802
BSHF, BSAF	1 063 098 8	1 063 100 3	1 063 103 8	1 063 105 4	1 063 107 0	1 063 109 7

Torque arms for KH167.., KH187..

As standard, torque arms are not available for gear unit sizes KH167.. and KH187... Please contact SEW-EURODRIVE for design proposals if you require torque arms for these gear units.

6.8 Flange contours of RF.. and R..F gear units

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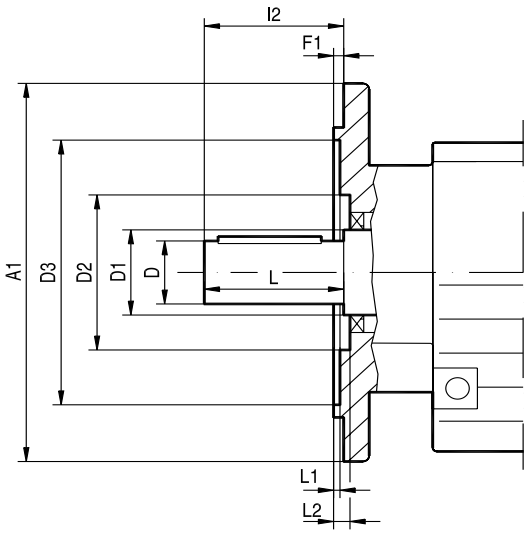

Check dimensions L1 and L2 for selection and installation of output elements.

Type	Dimensions in mm											
	A1	D	D1	D2		D3	F1	I2	L	L1		L2
				RF	R..F					RF	R..F	
RF07, R07F	120	20	22	38	38	72	3	40	40	2	2	6
	140[1)]				-	85	3			2	-	6
	160[1)]				-	100	3.5			2.5	-	6.5
RF17, R17F	120	20	25	46	46	65	3	40	40	1	1	5
	140				-	78	3			1	-	5
	160[1)]				-	95	3.5			1	-	6
RF27, R27F	120	25	30	54	54	66	3	50	50	1	1	6
	140				-	79	3			3	-	7
	160				-	92	3.5			3	-	7
RF37, R37F	120	25	35	60	63	70	3	50	50	5	4	7
	160				-	96	3.5			1	-	7.5
	200[1)]				-	119	3.5			1	-	7.5
RF47, R47F	140	30	35	72	64	82	3	60	60	4	1	6
	160				-	96	3.5			0.5	-	6.5
	200				-	116	3.5			0.5	-	6.5
RF57, R57F	160	35	40	76	75	96	3.5	70	70	4	2.5	5
	200				-	116	3.5			0	-	5
	250[1)]				-	160	4			0.5	-	5.5
RF67, R67F	200	35	50	90	90	118	3.5	70	70	2	4	7
	250				-	160	4			1	-	7.5
RF77, R77F	250	40	52	112	100	160	4	80	80	0.5	2.5	7
	300[1)]				-	210	4			0.5	-	7
RF87, R87F	300	50	62	123	122	210	4	100	100	0	1.5	8
	350				-	226	5			1	-	9
RF97	350	60	72	136		236	5	120	120	0		9
	450					320						
RF107	350	70	82	157		232	5	140	140	0		11
	450			186		316						
RF137	450	90	108	180		316	5	170	170	0		10
	550					416						
RF147	450	110	125	210		316	5	210	210	0		10
	550					416						
RF167	550	120	145	290		416	5	210	210	1		10
	660					517	6			2		11

1) The flange contour protrudes from under the base surface.

6.9 Flange contours of FF.., KF.., SF.. and WF.. gear units

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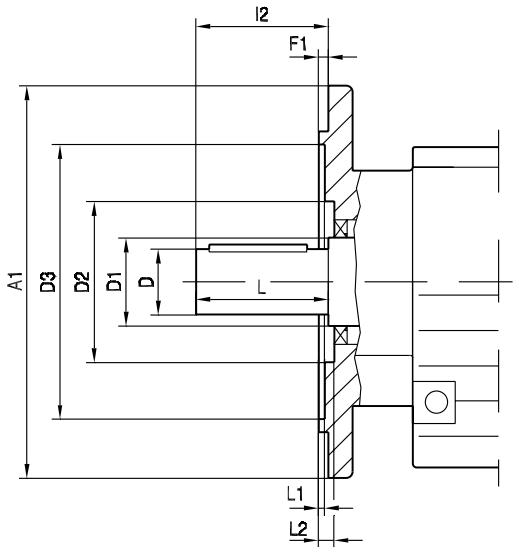

Check dimensions L1 and L2 for selection and installation of output elements.

Type	Dimensions in mm									
	A1	D	D1	D2	D3	F1	I2	L	L1	L2
FF27	160	25	40	66	96	3.5	50	50	3	18.5
FF37	160	25	30	70	94	3.5	50	50	2	6
FF47	200	30	40	72	115	3.5	60	60	3.5	7.5
FF57	250	35	40	84	155	4	70	70	4	9
FF67	250	40	50	84	155	4	80	80	4	9
FF77	300	50	55	82	205	4	100	100	5	9
FF87	350	60	65	115	220	5	120	120	5	9
FF97	450	70	75	112	320	5	140	140	8	10
FF107	450	90	100	159	318	5	170	170	16	9
FF127	550	110	118	-	420	5	210	210	10	-
FF157	660	120	135	190	520	6	210	210	8	14
KF37	160	25	30	70	94	3.5	50	50	2	6
KF47	200	30	40	72	115	3.5	60	60	3.5	7.5
KF57	250	35	40	84	155	4	70	70	4	9
KF67	250	40	50	84	155	4	80	80	4	9
KF77	300	50	55	82	205	4	100	100	5	9
KF87	350	60	65	115	220	5	120	120	5	9
KF97	450	70	75	112	320	5	140	140	8	10
KF107	450	90	100	159	318	5	170	170	16	9
KF127	550	110	118	-	420	5	210	210	10	-
KF157	660	120	135	190	520	6	210	210	8	14
SF37	120	20	25	-	68	3	40	40	6	-
SF37	160	20	25	-	96	3.5	40	40	5.5	-
SF47	160	25	30	70	94	3.5	50	50	2	6
SF57	200	30	40	72	115	3.5	60	60	3.5	7.5
SF67	200	35	45	-	115	3.5	70	70	8.5	-
SF77	250	45	55	108	160	4	90	90	8	9
SF87	350	60	65	130	220	5	120	120	6	10
SF97	450	70	75	150	320	5	140	140	8.5	10
WF10	80	16	25	-	39	2.5	40	40	30	-
WF10	120	16	25	39	74	3	40	40	5	30
WF20	110	20	30	44	53	-4	40	40	27	35
WF20	120	20	30	-	45	2.5	40	40	37.5	-
WF30	120	20	30	48	63	2.5	40	40	18	27
WF30	160	20	30	48	63	2.5	40	40	33	42
WF37	120	20	30	-	70	2.5	40	40	-	10.5
WF37	160	20	30	-	70	2.5	40	40	-	25.5

6.10 Flange contours of FAF.., KAF.., SAF.. and WAF.. gear units

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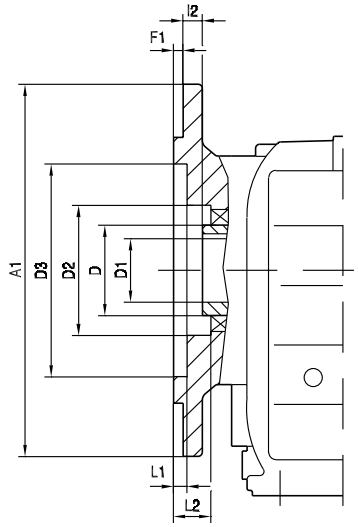

Check dimensions L1 and L2 for selection and installation of output elements.

Type	Dimensions in mm									
	A1	D	D1	D2	D3	F1	I2	L	L1	L2
FF27	160	25	40	66	96	3.5	50	50	3	18.5
FF37	160	25	30	70	94	3.5	50	50	2	6
FF47	200	30	40	72	115	3.5	60	60	3.5	7.5
FF57	250	35	40	84	155	4	70	70	4	9
FF67	250	40	50	84	155	4	80	80	4	9
FF77	300	50	55	82	205	4	100	100	5	9
FF87	350	60	65	115	220	5	120	120	5	9
FF97	450	70	75	112	320	5	140	140	8	10
FF107	450	90	100	159	318	5	170	170	16	9
FF127	550	110	118	-	420	5	210	210	10	-
FF157	660	120	135	190	520	6	210	210	8	14
KF37	160	25	30	70	94	3.5	50	50	2	6
KF47	200	30	40	72	115	3.5	60	60	3.5	7.5
KF57	250	35	40	84	155	4	70	70	4	9
KF67	250	40	50	84	155	4	80	80	4	9
KF77	300	50	55	82	205	4	100	100	5	9
KF87	350	60	65	115	220	5	120	120	5	9
KF97	450	70	75	112	320	5	140	140	8	10
KF107	450	90	100	159	318	5	170	170	16	9
KF127	550	110	118	-	420	5	210	210	10	-
KF157	660	120	135	190	520	6	210	210	8	14
SF37	120	20	25	-	68	3	40	40	6	-
SF37	160	20	25	-	96	3.5	40	40	5.5	-
SF47	160	25	30	70	94	3.5	50	50	2	6
SF57	200	30	40	72	115	3.5	60	60	3.5	7.5
SF67	200	35	45	-	115	3.5	70	70	8.5	-
SF77	250	45	55	108	160	4	90	90	8	9
SF87	350	60	65	130	220	5	120	120	6	10
SF97	450	70	75	150	320	5	140	140	8.5	10
WF10	80	16	25	-	39	2.5	40	40	30	-
WF10	120	16	25	39	74	3	40	40	5	30
WF20	110	20	30	44	53	-4	40	40	27	35
WF20	120	20	30	-	45	2.5	40	40	37.5	-
WF30	120	20	30	48	63	2.5	40	40	18	27
WF30	160	20	30	48	63	2.5	40	40	33	42
WF37	120	20	30	-	70	2.5	40	40	-	10.5
WF37	160	20	30	-	70	2.5	40	40	-	25.5

6.11 Fixed covers

Parallel shaft helical gear units, helical-bevel gear units, helical-worm and Spiroplan® gear units with hollow shafts and shrink discs of size 37 up to size 97 come equipped with a rotating cover as standard. If for safety reasons fixed covers are required for these gear units, you can order them for the respective gear unit types by quoting the part numbers in the following tables. Parallel shaft helical gear units and helical-bevel gear units with hollow shafts and shrink disks of size 107 and higher as well as parallel shaft helical gear units of size 27 come equipped with a fixed cover as standard.

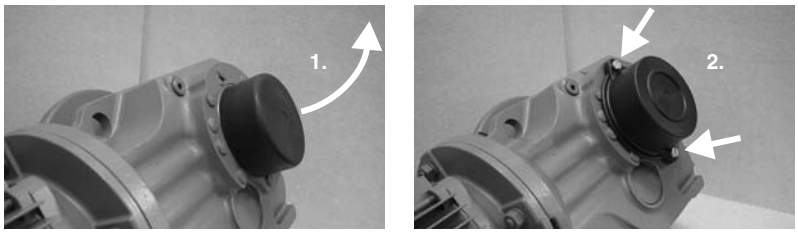

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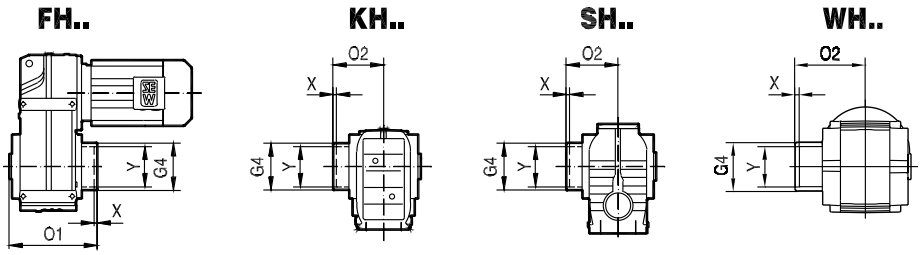
Figure 37: Replacing a rotating cover with a fixed cover

[1] Pull off the rotating cover

[2] Install and fasten fixed cover

Part numbers and dimensions



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Parallel shaft helical gearmotors	FH..37	FH..47	FH..57	FH..67	FH..77	FH..87	FH..97
Part number	643 513 0	643 514 9	643 515 7	643 515 7	643 516 5	643 517 3	643 518 1
Max. size of CM motor that can be mounted	CM71L	CM71L	CM90L	CM112M	CM112L	CM112H	CM112H
G4	78	88	100	100	121	164	185
O1	157	188.5	207.5	221.5	255	295	363.5
X	2	4.5	7.5	6	6	4	6.5
Y	75	83	83	93	114	159	174

Helical-bevel gearmotors[1)]	KH..37	KH..47	KH..57	KH..67	KH..77	KH..87	KH..97
Part number	643 513 0	643 514 9	643 515 7	643 515 7	643 516 5	643 517 3	643 518 1
G4 [mm]	78	88	100	100	121	164	185
O2 [mm]	95	111.5	122.5	129	147	172	210.5
X [mm]	0	1.5	5.5	3	1	2	4.5
Y [mm]	75	83	83	93	114	159	174

1) Not possible in foot-mounted helical-bevel gear units with hollow shafts and shrink discs (KH..B).

Helical-worm gearmotors	SH..37	SH..47	SH..57	SH..67	SH..77	SH..87	SH..97
Part number	643 512 2	643 513 0	643 514 9	643 515 7	643 516 5	643 517 3	643 518 1
G4 [mm]	59	78	88	100	121	164	185
O2 [mm]	88	95	111.5	123	147	176	204.5
X [mm]	1	0	1.5	3	1	0	0.5
Y [mm]	53	75	83	93	114	159	174

Spiroplan® gearmotors	WH..37						
Part number	1 061 136 3						
G4 [mm]	68						
O2 [mm]	95.5						
X [mm]	11						
Y [mm]	50						

6.12 Condition monitoring: Oil-aging and vibration sensor – R, F, K, S, W

Technical data for oil aging sensor

DUO10A diagnostic unit

/DUO10A	Technical data		
Preset oil grades	OIL1	CLP mineral oil.	T_{max} = 100 °C
		Bio oil	T_{max} = 100 °C
	OIL2	CLP HC synthetic oil:	T_{max} = 130 °C
		CLP PAO oil	T_{max} = 130 °C
	OIL3	CLP PG poly glycol	T_{max} = 130 °C
	OIL4	Food grade oil	T_{max} = 100 °C
Switch outputs	1: Early warning (time to next oil change can be set to between 2 and 100 days) 2: Main alarm (time to oil change 0 days) 3: Exceeded temperature T_{max} 4: DUO10A is ready for operation		
Permitted oil temperature	-40 °C to +130°C		
Permitted temperature sensors	PT1000		
EMC	IEC1000-4-2/3/4/6		
Ambient temperature	-25 °C to +70°C		
Operating voltage	DC 18-28 V		
Current consumption at DC 24 V	< 90 mA		
Protection class	III		
Degree of protection	IP67 (optionally IP69k)		
Housing materials	Evaluation unit: V2A, EPDM/X, PBT, FPM Temperature sensor: V4A		
Electrical connection	Evaluation unit: M12 plug connector PT1000 temperature sensor: M12 plug connector		

Designations and part numbers

Designation	Description	Part number
DUO10A 	Evaluation unit (basic unit)	1 343 875 1
DUO10A-PUR-M12-5m	5 m PUR cable with 1 connector	1 343 877 8
DUO10A-PVC-M12-5m	5 m PVC cable with 1 connector	1 343 878 6
DUO10A	Angle bracket	1 343 880 8
DUO10A D = 34	Installation clamp	1 343 879 4

Designation	Description	Part number
W4843 PT1000 	PT1000 temperature sensor	1 343 881 6
W4843_4x0.34-2m-PUR	2 m PUR cable for PT1000[1)]	1 343 882 4
W4843_4x0.34-2m-PVC	2 m PVC cable for PT1000[2)]	1 343 883 2
DUO10A 	Protection cap (for Aseptic, IP69K)	1 343 902 2

1) PUR cables are particularly suited for use in oil-contaminated environments.

2) PVC cables are particularly suited for use in wet environments.

Mounting on standard gear units (R, F, K, S, W)

Adapter for mounting the PT1000 temperature sensor in screw plug holes:

Complete adapter for PT1000 sensor	Part number
M10×1	1 343 903 0
M12 × 1.5	1 343 904 9
M22 × 1.5	1 343 905 7
M33 × 2	1 343 906 5
M42 × 2	1 343 907 3

Mounting base for installing the diagnostic unit at the gear unit with an angle bracket:

Mounting base with sealing ring	Part number
M10×1	1 343 441 1
M12 × 1.5	1 343 827 1
M22 × 1.5	1 343 829 8
M33 × 2	1 343 830 1
M42 × 2	1 343 832 8

Technical data for vibration sensor

DUV10A diagnostic unit

/DUV10A	Technical data
Measuring range	± 20 g
Frequency range	0.125 ... 500 Hz
Spectral resolution	0.125 Hz
Diagnostic processes	FFT, envelope-FFT, trend analysis
Minimum measuring period	8.0 s
Speed range	12 ... 3500 rpm
Switch outputs	1: Early warning 2: Main alarm
Operating voltage	DC 10-32 V
Current consumption at DC 24 V	100 mA
Protection class	III
EMC	IEC1000-4-2/3/4/6
Overload capacity	100 g
Ambient temperature	-30 °C to +60°C
Degree of protection	IP67
Housing materials	Zinc die-casting, coating based on epoxy finish, polyester membrane keypad
Electrical connection for supply and switching output	M12 plug connector
Electrical connection RS-232 for communication	M8 plug connector
Certificates and standards	CE, UL

Designations and part numbers

Designation	Description	Part number
DUV10A 	Diagnostic unit (basic unit)	1 406 629 7
DUV10A-S	Configuration software	1 406 630 0
DUV10A-K-RS232-M8	Communication cable	1 406 631 9
DUV10A-N24DC	DC 24 V power supply unit	1 406 632 7
DUV10A-I	Impulse tester	1 406 633 5
DUV10A-K-M12-2m PUR	2 m PUR cable with 1 connector[1)]	1 406 634 3
DUV10A-K-M12-5m PUR	5 m PUR cable with 1 connector[1)]	1 406 635 1
DUV10A-K-M12-2m PVC	2 m PVC cable with 1 connector[2)]	1 326 620 9
DUV10A-K-M12-5m PVC	5 m PVC cable with 1 connector[2)]	1 326 621 7

1) PUR cables are particularly suited for use in oil-contaminated environments.

2) PVC cables are particularly suited for use in wet environments.

Mounting on standard gear units (R, F, K, S)

Mounting base for installing the diagnostic unit at the gear unit:

Mounting base with sealing ring	Part number
M10×1	1 343 441 1
M12 × 1.5	1 343 827 1
M22 × 1.5	1 343 829 8
M33 × 2	1 343 830 1
M42 × 2	1 343 832 8

6.13 Lubricants and fill quantities – R, F, K, S, W gear units

General information

Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific gear unit and mounting position. The decisive factor is the mounting position (M1...M6, → chp. "Gear Unit Mounting Positions") specified when ordering the drive. You must adapt the lubricant fill in case of any subsequent changes made to the mounting position (→ Lubricant fill quantities).

	NOTE
	SEW-EURODRIVE fills the gear units with the amount of oil specified for the specific mounting positions. If the mounting position is changed, the amount of oil must be adapted as required. Consequently, a **mounting position may only be changed** after consultation with SEW-EURODRIVE, otherwise your right to claim under warranty **no longer applies**.

Lubricant table

The lubricant table on the following page shows the permitted lubricants for SEW-EURODRIVE gear units. Observe the following legend with regards to the lubricant table.

Key to the lubricant table

Abbreviations used, meaning of shading, and notes:

CLP	= Mineral oil
CLP PG	= Polyglycol (W gear units, conforms to USDA-H1)
CLP HC	= synthetic hydrocarbons
E	= Ester oil (water hazard class 1 (German regulation))
HCE	= synthetic hydrocarbons + ester oil (USDA - H1 certification)
HLP	= Hydraulic oil
	= synthetic lubricant (= synthetic-based roller bearing grease)
	= Mineral lubricant (= mineral-based rolling bearing grease)
1)	Helical-worm gear units with PG oil: please contact SEW-EURODRIVE.
2)	Special lubricant for Spiroplan® gear units only
3)	SEW-$f_B \geq 1.2$ required
4)	Pay attention to critical starting behavior at low temperatures!
5)	Low-viscosity grease
6)	Ambient temperature
	Lubricant for the food industry (food grade oil)
	Biodegradable oil (lubricant for agriculture, forestry, and fisheries)

Rolling bearing greases

The rolling bearings in gear units and motors are given a factory-fill with the greases listed below. SEW-EURODRIVE recommends regreasing rolling bearings with a grease fill at the same time as changing the oil or replacing the rolling bearings.

	Ambient temperature	Manufacturer	Type
Gear unit roller bearings	-40 °C ... +80 °C	Fuchs	Renolit CX-TOM15[1)]
Motor rolling bearings[2)]	-20 °C ... +80 °C	Esso	Polyrex EM
	+20 °C ... +100 °C	Klüber	Barrierta L55/2
	-40 °C ... +60 °C	Kyodo Yushi	Multemp SRL[3)]
Special greases for gear unit rolling bearings:			
	-30 °C ... +40 °C	Aral	Aral Eural Grease EP 2
	-20 °C ... +40 °C	Aral	Aral Aralube BAB EP2

1) Roller bearing grease based on partly synthetic base oil.

2) The motor rolling bearings are covered on both sides and cannot be regreased.

3) Recommended for continuous operation at ambient temperatures below 0°C, for example in a cold storage.

NOTE

The following grease quantities are required:

- For fast-running bearings (gear unit input end): Fill the cavities between the rolling elements one-third full with grease.
- For slow-running bearings (in gear units and at gear unit output end): Fill the cavities between the rolling elements two-thirds full with grease.

Lubricant table

01 805 10 92

	6) °C -50 0 +50 +100	DIN (ISO)	ISO,NLGI	Mobil®	Shell	Klüber	ARAL	bp	TEXACO	Castrol Tribol	Castrol Optimol	FUCHS	TOTAL
R...	Standard -10 +40	CLP(CC)	VG 220	Mobilgear 600 XP 220	Shell Omala 220	Klüberoil GEM 1-220 N	Aral Degol BG 220	BP Energol GR-XP 220	Meropa 220	Tribol 1100/220	Alpha SP 220 Optigear BM 220	Renolin CLP 220	Carter EP 220
	-25 +80	CLP PG	VG 220	Mobil Glygoyle 30	Shell Tivela S 220	Klübersynth GH 6-220	Aral Degol GS 220	BP Enersyn SG-XP 220	Synlube CLP 220	Tribol 800/220	Alphasyn PG 220 Optiflex A 220		Carter SY 220
K...(HK...)	4) -40 +80	CLP HC	VG 220	Mobil SHC 630	Shell Omala HD 220	Klübersynth GEM 4-220 N	Aral Degol PAS 220		Pinnacle EP 220	Tribol 1510/220	Alphasyn T 220 Optigear Synthetic X 220	Renolin Unisyn CLP 220	
	4) -40 +40		VG 150	Mobil SHC 629	Shell Omala HD 150	Klübersynth GEM 4-150 N			Pinnacle EP 150		Alphasyn T 150 Optigear Synthetic X 150		Carter SH 150
	-20 +25	CLP (CC)	VG 150 VG 100	Mobilgear 600 XP 100	Shell Omala 100	Klüberoil GEM 1-150 N	Aral Degol BG 100	BP Energol GR-XP 100	Meropa 150	Tribol 1100/100	Alpha SP/100/150 Optigear BM 100	Renolin CLP 150	Carter EP 100
F...	-30 +10	HLP (HM)	VG 68-46 VG 32	Mobil D.T.E. 13M	Shell Tellus T 32	Klüberoil GEM 1-68 N	Aral Degol BG 46		Rando EP Ashless 46	Tribol 1100/68	Hyspin AWS 32 Optigear 32	Renolin B 46 HVI	Equivis ZS 46
	4) -40 +20	CLP HC	VG 68	Mobil SHC 626									
	-40 +10	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32					Alphasyn T32 Optileb HY 32		Dacnis SH 32
	4) -40 -20	HLP (HM)	VG 22 VG 15	Mobil D.T.E. 11M	Shell Tellus T 15	Isoflex MT 30 ROT		BP Energol HLP-HM 15	Rando HDZ 15		Hyspin AWS 22		Equivis ZS 15
	Standard 0 +40	CLP (CC)	VG 680	Mobilgear 600 XP 680	Shell Omala 680	Klüberoil GEM 1-680 N	Aral Degol BG 680	BP Energol GR-XP 680	Meropa 680	Tribol 1100/680	Alpha SP 680 Optigear BM 680	Renolin SEW 680	Carter EP 680
	-20 +60	CLP PG	VG 680 1)		Shell Tivela S 680	Klübersynth GH 6-680		BP Enersyn SG-XP 680	Synlube CLP 680	Tribol 800/680	Optiflex A 680		
S...(HS...)	4) -30 +80	CLP HC	VG 460	Mobil SHC 634	Shell Omala HD 460	Klübersynth GEM 4-460 N			Pinnacle EP 460		Optigear Synthetic X 460		
	4) -40 +20		VG 150	Mobil SHC 629	Shell Omala HD 150	Klübersynth GEM 4-150 N			Pinnacle EP 150		Optigear Synthetic X 150		Carter SH 150
	-20 +10	CLP (CC)	VG 150 VG 100	Mobilgear 600 XP 100	Shell Omala 100	Klüberoil GEM 1-150 N	Aral Degol BG 100	BP Energol GR-XP 100	Meropa 150	Tribol 1100/100	Alpha SP/100/150 Optigear BM 100	Renolin CLP 150	Carter EP 100
	-25 +20	CLP PG	VG 220 1)	Mobil Glygoyle 30	Shell Tivela S 220	Klübersynth GH 6-220	Aral Degol GS 220	BP Enersyn SG-XP 220	Synlube CLP 220	Tribol 800/220	Alphasyn PG 220 Optiflex A 220		Carter SY 220
	4) -40 +20	CLP HC	VG 68	Mobil SHC 626									
	4) -40 0	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32			Cetus PAO 46		Alphasyn T32		Dacnis SH 32
R...,K...(HK...), F...,S...(HS...)	4) -30 +40	HCE	VG 460		Shell Cassida Fluid GL 460	Klüberoil 4UH1-460 N	Aral Eural Gear 460					Optileb GT 460	
	-20 +40	E	VG 460			Klüberbio CA2-460	Aral Degol BAB 460			Tribol Bio Top 1418/460			
W...(HW...)	Standard -20 +40	SEW PG	VG 460 2)			Klüber SEW HT-460-5							
	4) -40 +10	API GL5	SAE 75W90 (~VG 100)	Delvac Synth. GearOil LS 75 W90									
	-20 +40	CLP PG	VG 460 3)			Klübersynth UH1 6-460							
R32 R302	-25 +60	DIN 51 818	00	Glygoyle Grease 00	Shell Tivela GL 00	Klübersynth GE 46-1200			Multifak 6833 EP 00		Spheerol EPL 0		Marson SY 00
	Standard -15 +40 5)		000 - 0	Mobilux EP 004	Shell Alvania GL 00		Aralub MFL 00	BP Energrease LS-EP 00	Multifak EP 000		CLS Grease Longtime PD 00	Renolin SF 7 - 041	Multis EP 00

Lubricant fill quantities

The specified fill quantities are **recommended values**. The precise values vary depending on the number of stages and gear ratio. When filling, it is essential to check the **oil level plug since it indicates the precise oil capacity**.

The following tables show guide values for lubricant fill quantities in relation to the mounting position M1 ... M6.

Helical (R) gear units

RX..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RX57	0.60	0.80	1.30	1.30	0.90	0.90
RX67	0.80	0.80	1.70	1.90	1.10	1.10
RX77	1.10	1.50	2.60	2.70	1.60	1.60
RX87	1.70	2.50	4.80	4.80	2.90	2.90
RX97	2.10	3.40	7.4	7.0	4.80	4.80
RX107	3.90	5.6	11.6	11.9	7.7	7.7

RXF..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
RXF57	0.50	0.80	1.10	1.10	0.70	0.70
RXF67	0.70	0.80	1.50	1.40	1.00	1.00
RXF77	0.90	1.30	2.40	2.00	1.60	1.60
RXF87	1.60	1.95	4.90	3.95	2.90	2.90
RXF97	2.10	3.70	7.1	6.3	4.80	4.80
RXF107	3.10	5.7	11.2	9.3	7.2	7.2

R.., R..F

Gear units	Fill quantity in liters					
	M1[1)]	M2[1)]	M3	M4	M5	M6
R07	0.12	0.20	0.20	0.20	0.20	0.20
R17	0.25	0.55	0.35	0.55	0.35	0.40
R27	0.25/0.40	0.70	0.50	0.70	0.50	0.50
R37	0.30/0.95	0.85	0.95	1.05	0.75	0.95
R47	0.70/1.50	1.60	1.50	1.65	1.50	1.50
R57	0.80/1.70	1.90	1.70	2.10	1.70	1.70
R67	1.10/2.30	2.40/3.20	2.80	2.90	1.80	2.00
R77	1.20/3.00	3.30/4.20	3.60	3.80	2.50	3.40
R87	2.30/6.0	6.4/8.1	7.2	7.2	6.3	6.5
R97	4.60/9.8	11.7/14.0	11.7	13.4	11.3	11.7
R107	6.0/13.7	16.3	16.9	19.2	13.2	15.9
R137	10.0/25.0	28.0	29.5	31.5	25.0	25.0
R147	15.4/40.0	46.5	48.0	52.0	39.5	41.0
R167	27.0/70.0	82.0	78.0	88.0	66.0	69.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

RF..

Gear units	Fill quantity in liters					
	M1[1)]	M2[1)]	M3	M4	M5	M6
RF07	0.12	0.20	0.20	0.20	0.20	0.20
RF17	0.25	0.55	0.35	0.55	0.35	0.40
RF27	0.25/0.40	0.70	0.50	0.70	0.50	0.50
RF37	0.35/0.95	0.90	0.95	1.05	0.75	0.95
RF47	0.65/1.50	1.60	1.50	1.65	1.50	1.50
RF57	0.80/1.70	1.80	1.70	2.00	1.70	1.70
RF67	1.20/2.50	2.50/3.20	2.70	2.80	1.90	2.10
RF77	1.20/2.60	3.10/4.10	3.30	3.60	2.40	3.00
RF87	2.40/6.0	6.4/8.2	7.1	7.2	6.3	6.4
RF97	5.1/10.2	11.9/14.0	11.2	14.0	11.2	11.8
RF107	6.3/14.9	15.9	17.0	19.2	13.1	15.9
RF137	9.5/25.0	27.0	29.0	32.5	25.0	25.0
RF147	16.4/42.0	47.0	48.0	52.0	42.0	42.0
RF167	26.0/70.0	82.0	78.0	88.0	65.0	71.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

Parallel shaft helical (F) gear units

F.., FA..B, FH..B, FV..B

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.60	3.50	2.10	3.50	2.80	2.90
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.9	7.3	4.30	8.0	6.0	6.3
F..87	10.8	13.0	7.7	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	40.5	54.5	34.0	61.0	46.3	47.0
F..157	69.0	104.0	63.0	105.0	86.0	78.0

FF..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
FF27	0.60	0.80	0.65	0.70	0.60	0.60
FF37	1.00	1.25	0.70	1.30	1.00	1.10
FF47	1.60	1.85	1.10	1.90	1.50	1.70
FF57	2.80	3.50	2.10	3.70	2.90	3.00
FF67	2.70	3.80	1.90	3.80	2.90	3.20
FF77	5.9	7.3	4.30	8.1	6.0	6.3
FF87	10.8	13.2	7.8	14.1	11.0	11.2
FF97	19.0	22.5	12.6	25.6	18.9	20.5
FF107	25.5	32.0	19.5	38.5	27.5	28.0
FF127	41.5	55.5	34.0	63.0	46.3	49.0
FF157	72.0	105.0	64.0	106.0	87.0	79.0

FA.., FH.., FV.., FAF.., FAZ.., FHF.., FHZ.., FVF.., FVZ.., FT..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
F..27	0.60	0.80	0.65	0.70	0.60	0.60
F..37	0.95	1.25	0.70	1.25	1.00	1.10
F..47	1.50	1.80	1.10	1.90	1.50	1.70
F..57	2.70	3.50	2.10	3.40	2.90	3.00
F..67	2.70	3.80	1.90	3.80	2.90	3.20
F..77	5.9	7.3	4.30	8.0	6.0	6.3
F..87	10.8	13.0	7.7	13.8	10.8	11.0
F..97	18.5	22.5	12.6	25.2	18.5	20.0
F..107	24.5	32.0	19.5	37.5	27.0	27.0
F..127	39.0	54.5	34.0	61.0	45.0	46.5
F..157	68.0	103.0	62.0	104.0	85.0	77.0

Helical-bevel (K) gear units

K.., KA..B, KH..B, KV..B

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..37	0.50	1.00	1.00	1.25	0.95	0.95
K..47	0.80	1.30	1.50	2.00	1.60	1.60
K..57	1.10	2.20	2.20	2.80	2.30	2.10
K..67	1.10	2.40	2.60	3.45	2.60	2.60
K..77	2.20	4.10	4.40	5.8	4.20	4.40
K..87	3.70	8.0	8.7	10.9	8.0	8.0
K..97	7.0	14.0	15.7	20.0	15.7	15.5
K..107	10.0	21.0	25.5	33.5	24.0	24.0
K..127	21.0	41.5	44.0	54.0	40.0	41.0
K..157	31.0	62.0	65.0	90.0	58.0	62.0
K..167	33.0	95.0	105.0	123.0	85.0	84.0
K..187	53.0	152.0	167.0	200	143.0	143.0

KF..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
KF37	0.50	1.10	1.10	1.50	1.00	1.00
KF47	0.80	1.30	1.70	2.20	1.60	1.60
KF57	1.20	2.20	2.40	3.15	2.50	2.30
KF67	1.10	2.40	2.80	3.70	2.70	2.70
KF77	2.10	4.10	4.40	5.9	4.50	4.50
KF87	3.70	8.2	9.0	11.9	8.4	8.4
KF97	7.0	14.7	17.3	21.5	15.7	16.5
KF107	10.0	21.8	25.8	35.1	25.2	25.2
KF127	21.0	41.5	46.0	55.0	41.0	41.0
KF157	31.0	66.0	69.0	92.0	62.0	62.0

KA.., KH.., KV.., KAF.., KHF.., KVF.., KAZ.., KHZ.., KVZ.., KT..

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
K..37	0.50	1.00	1.00	1.40	1.00	1.00
K..47	0.80	1.30	1.60	2.15	1.60	1.60
K..57	1.20	2.20	2.40	3.15	2.70	2.40
K..67	1.10	2.40	2.70	3.70	2.60	2.60
K..77	2.10	4.10	4.60	5.9	4.40	4.40
K..87	3.70	8.2	8.8	11.1	8.0	8.0
K..97	7.0	14.7	15.7	20.0	15.7	15.7
K..107	10.0	20.5	24.0	32.4	24.0	24.0
K..127	21.0	41.5	43.0	52.0	40.0	40.0
K..157	31.0	66.0	67.0	87.0	62.0	62.0

Helical-worm (S) gear units

S

Gear units	Fill quantity in liters					
	M1	M2	M3[1)]	M4	M5	M6
S..37	0.25	0.40	0.50	0.55	0.40	0.40
S..47	0.35	0.80	0.70/0.90	1.00	0.80	0.80
S..57	0.50	1.20	1.00/1.20	1.45	1.30	1.30
S..67	1.00	2.00	2.20/3.10	3.10	2.60	2.60
S..77	1.90	4.20	3.70/5.4	5.9	4.40	4.40
S..87	3.30	8.1	6.9/10.4	11.3	8.4	8.4
S..97	6.8	15.0	13.4/18.0	21.8	17.0	17.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

SF..

Gear units	Fill quantity in liters					
	M1	M2	M3[1)]	M4	M5	M6
SF37	0.25	0.40	0.50	0.55	0.40	0.40
SF47	0.40	0.90	0.90/1.05	1.05	1.00	1.00
SF57	0.50	1.20	1.00/1.50	1.55	1.40	1.40
SF67	1.00	2.20	2.30/3.00	3.20	2.70	2.70
SF77	1.90	4.10	3.90/5.8	6.5	4.90	4.90
SF87	3.80	8.0	7.1/10.1	12.0	9.1	9.1
SF97	7.4	15.0	13.8/18.8	22.6	18.0	18.0

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

SA.., SH.., SAF.., SHZ.., SAZ.., SHF.., ST..

Gear units	Fill quantity in liters					
	M1	M2	M3[1)]	M4	M5	M6
S..37	0.25	0.40	0.50	0.50	0.40	0.40
S..47	0.40	0.80	0.70/0.90	1.00	0.80	0.80
S..57	0.50	1.10	1.00/1.50	1.50	1.20	1.20
S..67	1.00	2.00	1.80/2.60	2.90	2.50	2.50
S..77	1.80	3.90	3.60/5.0	5.8	4.50	4.50
S..87	3.80	7.4	6.0/8.7	10.8	8.0	8.0
S..97	7.0	14.0	11.4/16.0	20.5	15.7	15.7

1) The larger gear unit of multi-stage gear units must be filled with the larger oil volume.

Spiroplan® (W-) gear units

The fill quantity of Spiroplan® gear units W..10 to W..30 does not vary, irrespective of their mounting position. Only the fill quantity of Spiroplan® gear unit W..37 in mounting position M4 is different from that of other mounting positions.

Gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
W..10	0.16					
W..20	0.24					
W..30	0.40					
W..37	0.50			0.70	0.50	

6.14 Lubricants and fill quantities – BS.F, PS.F gear units

General information

Unless a special arrangement is made, SEW-EURODRIVE supplies the gear units with a lubricant fill adapted for the specific mounting position. The decisive factor is the mounting position (M1...M6) specified when ordering the drive. The standard synthetic lubricant has a service life of approximately 5 years under normal operating conditions.

NOTE

SEW-EURODRIVE fills the gear units with the amount of oil specified for the specific mounting positions. If the mounting position is changed, the amount of oil must be adapted as required. Consequently, a **mounting position may only be changed** after consultation with SEW-EURODRIVE, otherwise your right to claim under warranty **no longer applies**.

NOTE

The BS.F helical-bevel and PS.F planetary gear units from SEW-EURODRIVE are supplied exclusively with synthetic lubricants.

Food-grade lubricants are available from SEW-EURODRIVE on request.

The following lubricant tables show the permitted standard lubricants for BS.F.. helical-bevel gear units and PS.F planetary gear units from SEW-EURODRIVE.

Lubricant table for gear unit oil for BS.F helical-bevel gear units

BSF..	Ambient temperature ° C -20 0 +20 +40 +60	API class	ISO	Oil	Anti-friction bearing grease
	–20 +40	GL5	VG ~ 100	Mobillube SHC 75W-90 LS	Mobiltemp 100

57358AEN

Lubricant table for the food industry

BSF..	Ambient temperature ° C -20 0 +20 +40 +60	ISO	Oil	Anti-friction bearing grease
	–20 +40	VG 460	Klübersynth UH1 6-460	Aral Eural Grease EP2

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Fill quantities depending on the mounting positions

The following tables show guide values for lubricant fill quantities in relation to the mounting position M1 ... .

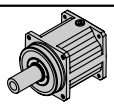
Fill quantities for BS.F helical-bevel gear units

BSF.. helical-bevel gear units	Fill quantity in liters					
	M1	M2	M3	M4	M5	M6
BSF202	0.15	0.25	0.25	0.30	0.25	0.25
BSF302	0.25	0.50	0.50	0.55	0.35	0.35
BSF402	0.45	0.80	0.80	1.05	0.65	0.65
BSF502	1.00	1.80	1.80	2.50	1.50	1.50
BSF602	1.60	2.50	2.80	4.10	2.00	2.60
BSF802	3.30	5.30	5.70	7.90	4.50	4.50

Fill quantity tolerance for BSF..

Fill quantity in liter [l]	Tolerance
Up to 1 l	0.01 l
> 1 l	1% of the fill quantity

Lubricant table for gear unit oil for PS.F planetary gear units

PSF..	Ambient temperature	DIN ISO	ISO	Oil	Anti-friction bearing grease
	° C -20 0 +20 +40 +60 - 20 + 40	CLP PG 220[1)]	VG 220	Klübersynth GH6-220	Klüber Petamo GHY 133 N

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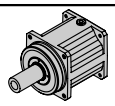
1) CLP PG = Polyglycol

Lubricant table for the food industry

PSF..	Ambient temperature	ISO	Oil	Anti-friction bearing grease
	° C -20 0 +20 +40 +60 –20 +40	VG 460	Klübersynth UH1 6-460	Aral Eural Grease EP2

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Fill quantities depending on the mounting positions

The following tables show guide values for lubricant fill quantities in relation to the mounting position M1 ... .

Fill quantities for PS.F planetary gear units

PSF.. planetary gear units	Adapter mounting - Fill quantity in liters [l]			Direct mounting Fill quantity in liters [l]		
	M1 (M3, M5, M6)	M2	M4	M1 (M3, M5, M6)	M2	M4
PSF121	0.023	0.025	0.023	0.023	0.037	0.023
PSF122	0.035	0.056	0.054	0.035	0.068	0.054
PSF221	0.035	0.052	0.035	0.035	0.063	0.035
PSF222	0.045	0.075	0.085	0.045	0.085	0.085
PSF321	0.070	0.100	0.070	0.070	0.120	0.070
PSF322	0.095	0.170	0.190	0.095	0.185	0.190
PSF521	0.140	0.215	0.150	0.140	0.245 (0.270)*	0.150
PSF522	0.200	0.360	0.395	0.200	0.380	0.395
PSF621	0.300	0.465	0.320	0.300	0.500 (0.550)*	0.320
PSF622	0.410	0.680	0.780	0.410	0.710	0.780
PSF721	0.600	0.930	0.650	0.600	1.060	0.650
PSF722	0.750	1.230	1.645	0.750	1.280	1.645
PSF821	1.000	1.750	1.350	-	-	-
PSF822	1.550	2.550	3.350	1.550	2.640	3.350
PSF921	1.400	2.450	1.900	-	-	-
PSF922	2.050	3.500	4.350	2.050	3.650	4.350

PSBF.. planetary gear unit	Adapter mounting - Fill quantity in liters [l]			Direct mounting Fill quantity in liters [l]		
	M1 (M3, M5, M6)	M2	M4	M1 (M3, M5, M6)	M2	M4
PSBF221	0.025	0.040	0.025	0.025	0.051	0.025
PSBF222	0.035	0.061	0.060	0.035	0.074	0.060
PSBF321	0.045	0.068	0.050	0.045	0.085	0.050
PSBF322	0.070	0.135	0.130	0.070	0.145	0.130
PSBF521	0.093	0.143	0.103	0.093	0.168 (0.193)*	0.103
PSBF522	0.143	0.288	0.273	0.143	0.308	0.273
PSBF621	0.198	0.318	0.188	0.198	0.358 (0.408)*	0.188
PSBF622	0.298	0.538	0.498	0.298	0.568	0.498
PSBF721	0.474	0.684	0.314	0.404	0.544	0.314
PSBF722	0.564	0.884	1.004	0.544	0.834	1.004
PSBF821	0.495	0.995	0.695	-	-	-
PSBF822	0.995	1.795	1.995	0.995	1.895	1.995

*) Fill quantities for direct mounting of CFM90 servomotors

Fill quantity tolerances for PS.F

Planetary gear units	Fill quantity tolerance in liters [l]
PS.F121/122	± 0.001
PS.F221/222	± 0.001
PS.F321/322	± 0.002
PS.F521/522	± 0.005
PS.F621/622	± 0.005
PS.F721/722	± 0.010
PS.F821/822	± 0.010
PS.F921/922	± 0.010